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A revision of some species of Ectropothecium

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(WITH PLATES 13 AND 14)

Whilst studying lately some West Indian examples of the genus *Ectropothecium* Mitt., received from the New York Botanical Garden, U. S. A., it became necessary to examine the type-specimens of the following plants — *E. vesiculare* (Schwaegr.) Mitt., *E. rutilans* (Brid.) Mitt., *E. malachiticum* (C. Müll.) Paris, *E. Poeppigianum* (Hampe) Jaeger, *E. conostegum* (C. Müll.) Mitt., *E. flavoviride* Mitt., *E. crassicaule* Mitt., *Hookeria praelonga* W. Arnott and the plant sent out under the name *Hypnum Montagnei* Schimp. in Wright's Cuban Mosses, number *120*. The result of the study and comparison of type specimens and authentic examples of the above plants has enabled me to make the following revision.

Bridels' *Leskia rutilans* (1827) from St. Domingo proves to be identical with Schwaegrichen's *Hypnum vesiculare* (1827) from Jamaica ; and Müller's *Vesicularia malachitica* (1898) from Porto Rico is also the same species. A specimen in Mitten's herbarium labeled " Brazil " is also to be referred to *E. vesiculare*.

Hampe's *Hookeria Poeppigiana* (1844), from Peru, which has been sunk in *E. vesiculare*, proves to be a well marked variety of that species, and to be identical with Müller's *Hypnum conostegum* (1851) from Cuba and St. Domingo. Mitten's *E. flavoviride* (1869) from Cuba is a form of this same variety *Poeppigianum*.

E. crassicaule Mitt. (1869) from Cuba appears distinct from all the above mentioned plants.

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Hookeria praelonga W. Arnott, from Rio de Janeiro, which has been referred to *E. vesiculare*, proves to be a species of *Ectropothecium* allied to, if not identical with, *E. amphibolum* Spruce.

As regards "*Hypnum Montagnei* Schimp." the following plants have been sent out under the number *120* in Wright's Cuban Mosses. In Mitten's herbarium and in the Kew herbarium three distinct plants appear under the number *120*, viz., *E. vesiculare* (Schwaegr.), *E. vesiculare Poeppigianum* (Hampe), and *E. crassicaule* Mitt. In Müller's herbarium both *E. vesiculare* and the variety *Poeppigianum* are found under the number *120*. The plant quoted by Mitten, "Wright, inter 120," as belonging to *E. amphibolum* Spruce proves to be *E. vesiculare*. The plant, "n. 120 ex parte" in Mitten's herbarium, on which Mitten founded his *E. flavoviride* is a form of the variety *Poeppigianum*; while *E. crassicaule* Mitt. founded also on "n. 120 ex parte" proves, as mentioned above, to be a distinct species. It may be mentioned here that from Montagne's original description of "*H. Montagnei*" the plant appears to be *E. vesiculare Poeppigianum*; specimens from Montagne's herbarium, however, are *E. vesiculare* type.

The result of the above investigations shows how necessary it is in the first place, in describing the moss-flora of any country, to examine types and historical specimens in herbaria in order to remove the errors which have accumulated round certain species.

My sincere thanks are due to the authorities at the Berlin Museum and the Herbier Boissier for kindly allowing me to see specimens from, respectively, Müller's and Schwaegrichen's herbaria; to Mr. William Mitten, A.L.S., for kindly sending me a large number of specimens of *Ectropothecium* from his herbarium; and to Professor F. O. Bower, F.R.S., for allowing me to examine a specimen from Walker-Arnott's herbarium.

I give below diagnoses drawn up from the examination of the type and authentic specimens, and the revised synonymy and distribution. In the study of the species of this difficult genus *Ectropothecium* the shape and areolation of the *ventral branch-leaves* afford important specific characters. By paying attention to these points the two species *E. vesiculare* (Schwaegr.) and *E. amphibolum* Spruce, which are both variable species and often closely resemble each other, can be at once separated.

ECTROPOTHECIUM VESICULARE (Schwaegr.) Mitt.

Hypnum vesiculare Schwaegr. Sp. Musc. Frond. Suppl. **2**: 167, *pl.* 199. 1827; C. Müll. Syn. **2**: 235 (sect. *Omalia* subsect. *Vesicularia*) (syn. *Hookeria praelonga* Walk. Arnott excl.) 1851.

Leskia (*Omalia*) *rutilans* Brid. Bryol. Univ **2**: 332 (var. *portoricensis* excl.) 1827.

Hypnum rutilans (Brid.) C. Müll. Syn. **2**: 234 (sect. *Omalia* subsect. *Vesicularia*) (habitat. quibusdam probabiliter excl.) 1851.

Ectropothecium vesiculare (Schwaegr.) Mitt. Musc. Austr.-Amer. 518 (synon. et habitat. peruvianis excl.) 1869; Jaeger, Adumbr. **2**: 534 (habitat. peruv. excl.) 1879; Paris, Index Bryol. 89 (syn. et habitat. quibusdam excl.) 1895.

E. rutilans (Brid.) Mitt. Musc. Austr.-Amer. 519 (habitat. quibusdam probabil. excl.) 1869; Jaeger, Adumbr. **2**: 538 (habitat. quibusdam prob. excl.) 1879; Paris, Index Bryol. 86 (habitat. quibusdam prob. excl.) 1895.

Vesicularia malachitica C. Müll. Hedwigia, **37**: 251. 1898.

Ectropothecium malachiticum (C. Müll.) Paris, Index Bryol. Suppl. **1**: 136. 1900.

Tenellum depresse caespitosum laete viride vel aeruginoso-viride raro flavo-viride monoicum; caule tenui interdum subelongato repente hic illic cortici radicularum ope brunnearum fasciculatarum adhaerente ramis distichis depressis saepe alternis interrupte pinnatim ramoso, ramis subcomplanatis approximatis patentissimis saepe per totam longitudinem arcuatis simplicibus vel raro ramulis brevibus perpaucis ramosis brevibus 2–4 mm. longis latitudinem cum foliis 0.80–1 mm. latis interdum elongatioribus ad 8 mm. longis latitudine cum foliis 1.5 mm. latis, foliis caulinis dorsalibus et lateralibus patentibus siccitate imbricatis erecto-patentibus late subtriangularibus et late ovatis acuminatis acumine interdum subrecurvo margine integro vel in folii apice minutissime denticulato cellulis laxis pellucidis superioribus hexagonis circ. 30–40 × 22–25 μ, foliis caulinis ventralibus minoribus e basi lata oblonga vel subquadrata concava acuminatis acumine plus minus recurvo tenerius areolatis, foliis rameis dorsalibus et lateralibus confertis subdistichis planiuscule compressis patentibus siccitate plus minus crispulis ovatis vel late ovatis interdum rotundato-ovatis breviter et abrupte acuminatis interdum apiculato-acuminatis basi saepe inaequalibus praeter apicem summum minutissime denticulatum

integris nervis binis brevissimis interdum indistinctis cellulis laxis pellucidis late et breviter hexagonis et subhexagonis circ. 20 × 25 –30 μ basin versus gradatim longioribus, foliis rameis ventralibus multo minoribus et tenerioribus e basi lata ovata concava breviter acuminatis interdum subtriangularibus cellulis laxis hexagonis et subhexagonis circ. 15–20 × 40–50 μ, foliis perichaetialibus erectis apice interdum flexuoso-patentibus superioribus caulinis majoribus circ. 1.5 mm. longis e basi ovata vel oblonga tenuiter filiformi-acuminatis enervibus cellulis superioribus longis augustioribus margine integro vel apicem versus minutissime subdenticulato, capsula in pedunculo 1–1.5 cm. longo gracili erecto purpureo laevi apice incurvo breviter et turgide oblonga vel urceolata macrostoma maturitate infra orificium contracta badia horizontali tandem nutante parvula 0.75–1 mm. × 0.50–0.60 mm. raro 1.25 × 1 mm. leptodermatica basi ima stomatibus superificialibus paucis instructis exothecii cellulis prominentibus subquadratis 25–30 μ latis ad capsulae orificium subito minoribus, operculo e basi majore convexa plus minus longe apiculato humore vero conico-acuminato, peristomii externi dentibus lineari-lanceolatis basin versus dense striato-trabeculatis badiis apice albidis papillosis interni magnis quandoque emergentibus lanceolatis carinatis lacunis dorsalibus plus minus distinctis ciliis 2–3 vel apice in unum coalitis nodulosis longis interpositis, membrana basilari alta fere ad peristomii externi dentium medium producto, calyptra subulata latere fissa pallide virente; floribus masculis minutis pluribus in caule prope flores femineos positis, foliis perigonialibus ovatis breviter acuminatis integris cellulis laxis hexagonis, antheridiis paraphysibus filiformibus immixtis.

Hab. Ind. occid: Jamaica, ad rupes et fontes prope plantationem Richmond, c. fr., leg. D. Reider (in herb. Schwaegr.)! St. Domingo (Hispaniola), c. fr. (in herb. Bridel.)! Cuba, ad truncos putridos in sylvis, c. fr., C. Wright, *no. 120*, partim, sub *Hypno Montagnei*, (Kew, Brit. Mus. et in herb. Mitten., etiam in herb. Müller., sub *Hypno conostego*, partim)! Porto Rico, Sierra de Lares, ad arbores, c. fr., Feb. 3, 1887, leg. Sintenis (in herb. Müller., sub *Vesicularia malachitica*)!

Amer. austr: Brazil, c. fr. (in herb. Mitten.)!

Schwaegrichen's *Hypnum vesiculare* was published in 1827, a good description of the species, together with figures, being given. The type-specimens collected in Jamaica, and preserved in Schwaegrichen's herbarium, represent a rather small state of the species, with branches 3.5 mm. long, which, with the leaves,

measure a little under 1 mm. wide. Very rarely indeed a branch occurs which bears a very short branchlet. The dorsal and lateral branch-leaves are entire, or minutely denticulate at the extreme apex; they commonly approach roundish-ovate in shape, with the apex shortly and often abruptly apiculato-acuminate. These leaves do not exceed 0.75 mm. in length.

In the same year (1827) Bridel published a moss, from St. Domingo, as a new species under the name *Leskia* (*Omalia*) *rutilans*. I have seen the type of this in Bridel's herbarium. The sheet containing it bears two labels; on one is written "*Pterigophyllum rutilans* N. *Leskia rutilans* N. *L. Omalia rutilans* Bryol. Univ. Saint Domingo. Balbis. Lyon. 1820." There are examples of two mosses pasted down above this label, one being the type of Bridel's species, while the other is a species of the genus *Hookeria*. Over the first moss has been written in Müller's handwriting, "*Om. rutilans;*" over the second, "*Alia species.*"

Now this type-specimen of Bridel's "*L. rutilans*" agrees exactly with Schwaegrichen's type-specimen of "*H. vesiculare.*" One indeed was prepared for the fact of the identity of the two plants on reading Bridel's description of his plant ("Laete virens, complanata, simpliciter pinnato-ramosa, ramis brevibus parallelis. Folia duplici serie disticha, subrotundo-ovata, subintegerrima, laete viridia, laxissime ovato-areolata, diaphana") and comparing it with the description and figures given by Schwaegrichen.

It is most probably the erroneous statement made by authors with regard to the inflorescence of *E. rutilans* which has caused the two plants to be regarded as distinct species up to the present day. Bridel in his diagnosis makes no mention at all of the inflorescence. In Müller's "Synopsis," however, Bridel's plant is described as "dioicum?" In Mitten's "Musci Austro-Amer." we find *E. rutilans* separated as being dioicous from the monoicous species *E. vesiculare*, *E. amphibolum*, etc. As a matter of fact Bridel's plant is monoicous, and the type-specimens bear abundant male and female flowers. Müller in his "Synopsis" compares "*H. rutilans*" with *H. subdenticulatum*, *H. conostegum*, and *H. Poeppigianum*, but not with *H. vesiculare;* we may infer from this that it is most probable that Müller had not seen at the time Schwaegrichen's plant.

Bridel published his species from the single locality, "In Hispaniolâ unde missam Balbisius habuit et communicavit, in arboribus habitat." Müller, however, in describing the plant in the "Synopsis" does not mention this locality, but gives, apparently by a mistake, the habitat "Portorico: Bertero." For the following reason it seems possible that this mistake arose through some error of copying. As mentioned above, there are two labels on the sheet of "*L. rutilans*" in Bridel's herbarium. On one label is written "*Leskia capillaris*, ad saxa locis udis Portorico" in one handwriting, and to this is added, in Bridel's handwriting, "Balbis Lyon 1820." Over the plant to which this label belongs Müller has written "*Omalia rutilans* Brid." It is to be noted, however, that Bridel himself has not in any way identified this moss as belonging to his "*L. rutilans*." An examination of this plant from Porto Rico shows that it belongs to a small form of *Ectropothecium amphibolum* Spruce — agreeing exactly with the plant sent out in Spruce Musc. Amazon. et And. *no. 1145*, from the Andes of Peru, and also with examples from Cuba (collected by Liebmann) in the Kew Herbarium. It may be questioned, perhaps, if the other localities given by Müller, viz., "Venezuela, Cumbre de Valenzia, alt. 3,000′: Wagner 1848," and "Insula St. Catharina Brasiliae, loc. umbrosis pr. Destero, Jan. et Febr. 1847: Pabst" really belong to the present species.

The example named "*E. rutilans*" by Mitten, in the Kew Herbarium, from Rio de Janeiro (comm. A. Glaziou, *no. 7453*) belongs to *E. amphibolum* Spruce; the inflorescence is monoicous.

Since Schwaegrichen's and Bridel's names date from the same year, we are at liberty to choose either for the present species. Schwaegrichen's name is, however, preferable on every ground, both for the reason that a clear description, indicating the inflorescence, together with a good figure, is given of *H. vesiculare*, and that Bridel included under *L. rutilans* a variety "*portoricensis*," which proves to be specifically distinct.

The plant from Rio de Janeiro (collected by Jameson) published in 1824 as a new species under the name of *Hookeria praelonga* by Walker-Arnott (Mem. Wernerian Nat. Hist. Soc. **5**: 203) was referred to by Wilson (London Jour. Bot. **7**: 278. 1848) in a note on "*Hypnum scaturigenum* Schwaegr." as follows:

"This moss may be the same species as *Hookeria praelonga* Arnott, and possibly, also, *Hypnum vesiculare* Schwaegr." This remark of Wilson's was somewhat altered by Müller, who stated in the "Synopsis," under *Hypnum vesiculare*, "*Hookeria praelonga* W. Arn. ex animadv. Wilsoni in Lond. Journ. of bot. 1848. p. 278, huc pertinere dicitur." Mitten, also (Musci Austro-Amer. 518), quotes *Hookeria praelonga* "W. Arn. ex obs. Wils." as a synonym of *Hypnum vesiculare*. I have been able to examine the type-specimens of *Hookeria praelonga* in Arnott's herbarium at the University of Glasgow, and find that this plant is quite distinct specifically from *E. vesiculare*; it is a species of *Ectropothecium* allied to *E. amphibolum*, or is possibly a form of that species.

"*Hypnum Montagnei*," from Cuba, belongs in part to *E. vesiculare* type, and in part to the var. *Poeppigianum* described below. There is a specimen in the Kew Herbarium, labelled in Montagne's handwriting "*Pterygophyllum Montagnei* Belang. Voy. Ind. Or. Cuba," which is undoubtedly specifically identical with Schwaegrichen's plant. The specimen consists of portions of two fruiting stems, and in the small size and general habit of the plant, as well as in the shape of stem- and branch-leaves, areolation, etc., this Cuban plant agrees exactly with the type-specimen of *E. vesiculare* (from Jamaica) in Schwaegrichen's herbarium. In a few instances, however, the branches reach a length of 5 mm., and measure, with their leaves, about 1 mm. wide. The same plant, in a slightly more robust state, was sent out, under the name *Hypnum Montagnei* Schimp., as part of *no. 120* in Wright's Cuban Mosses,—at least as regards the examples under this number in the Kew, British Museum, and Mitten's herbaria. These specimens, whilst certainly belonging to Schwaegrichen's species, represent a larger, more luxuriant state. Some of the branches attain a length of 8 mm., and sometimes, though rarely, bear a short branchlet. The branches with their leaves are about 1.5 mm. wide.

In the example in Müller's herbarium labeled "*Hypnum conostegum* C. Müll., Cuba, decayed logs in forests. Wright n. 120 = *H. Montagnei* Sch. ex C. M.," some of the specimens are clearly the same as the plant from Cuba (collected by Döring) described by Müller as *H. conostegum*—a plant which, as mentioned below, I cannot separate from the var. *Poeppigianum* of *E.*

vesiculare. Mixed with these, however, are plants which are clearly referable to *H. vesiculare* type, agreeing perfectly in the habit, the small size, the short branches, and small roundly ovate apiculate-acuminate branch-leaves.

The plant figured natural size under the name *H. Montagnei* Schimp., by Montagne in La Sagra, Hist. Cuba, Crypt. *pl. 20. f. 1*, has the more robust habit and regular pinnate branching of the var. *Poeppigianum* described below.

Mitten quotes (Musci Austro-Amer. 519) under *E. amphibolum*, Cuba, "Wright, inter n. 120," but the plant referred to belongs — as the specimen in Mitten's herbarium shows — to *E. vesiculare*. Mitten quotes (*l. c.* 518) also a plant collected by Spruce in the Andes of Peru (Spruce, Musc. Amazon. et And. *no. 1145*) as belonging to *E. vesiculare*. In the examples under this number in Mitten's herbarium, and in the herbaria at Kew and the British Museum, however, the plant is not *E. vesiculare*, but *E. amphibolum*, showing clearly the more denticulate dorsal and lateral branch-leaves, and the characteristic shape and areolation of the ventral branch-leaves of the latter species. The same is also the case with specimens in the Kew Herbarium, from Rio de Janeiro (collected by Glaziou), which have been referred to *E. vesiculare* by Mitten.

In Mitten's herbarium there is a small specimen consisting of part of a stem bearing one seta (without a capsule) labelled "Brazil." This moss unquestionably belongs to true *E. vesiculare*.

Unless careful attention is paid to certain points the present species is very liable to be confused with *E. amphibolum*. *E. vesiculare* type may usually be known by its smaller size, and more compact habit, with the branches more complanate, spreading at right angles, and more or less arcuate; it is, however, by certain characters shown invariably by the branch-leaves that the two species are best distinguished. In *E. vesiculare* the ventral branch-leaves are broadly ovate-acuminate, and the areolation is lax, with hexagonal and subhexagonal cells, measuring 15–20 × 40–50 μ. In *E. amphibolum* the ventral branch-leaves are more longly acuminate from a narrower ovate base, or are sometimes ovate-lanceolate; the areolation is narrow, with subprosenchymatous cells measuring 15 × 80–100 μ. The dorsal and lateral

branch-leaves, also, of the two species show constant differences. In *E. vesiculare* the leaves are subentire, the margin being minutely denticulate only at the extreme apex; and the areolation of the leaf in the upper half is remarkably lax, with the marginal cells wide. In *E. amphibolum* the margin is more evidently denticulate for a greater distance below the apex; the areolation is decidedly less lax, and the marginal cells are distinctly narrower than the rest, often forming a kind of indistinct border, which is most evident when the leaf is viewed under a low magnification.

Müller has recently (Hedwigia, **37**: 251 1898) described a moss from Portorico under the name *Vesicularia malachitica*, with the characters, "monoica; cespites latissime expansi planissimi aeruginosi teneri; folia e cellulis pro foliolo majusculis laxis chlorophyllosis utriculo primordiali repletis breviusculis reticulata, integerrima. . . . E minutissimis Vesicullariis, minutie partium omnium et colore malachitico primo visu distinguenda." Müller quotes the synonym "*Hypnum Montagnei* Hpe. in Musc. Portoricens. Schwaneckianis no. 41" for his plant. I have seen the type-specimens of *V. malachitica* in Müller's herbarium, labelled "Puerto Rico, Sierra de Lares, ad arbores, Feb. 3, 1887, Leg. Sintenis." The moss is certainly *E. vesiculare* Schwaegr., and is identical in the aeruginose color, habit, etc., with the plant sent out as part of number *120* in Wright's Cuban mosses, under the name *Hypnum Montagnei* Schimp., and which Mitten (Musci Austro-Amer.) has wrongly referred to *E. amphibolum*.

I have not seen the calyptra of the present species, and have therefore in the diagnosis given above repeated Schwaegrichen's description. Montagne (in La Sagra, Hist. Cuba, Bot. 532) says of the calyptra of "*Hypnum Montagnei*" "Calyptra mature decidua longe subulata, pallide viridis, stylo residuo coronata, basi hinc breviter fissa."

Ectropothecium vesiculare Poeppigianum (Hampe).

Hypnum Montagnei Schimp. ex Mont. in La Sagra, Hist. Cuba, Bot. 530 (partim). 1842; et in La Sagra. Fl. Cub. **1**: 315. *pl. 20. fig. 1* (partim). 1853.

Hookeria Poeppigiana Hampe, Icon. Musc. *pl. 4.* 1844.

Hypnum Poeppigianum Hampe ex C. Müll. Syn. **2**: 235 (sect. *Omalia*, subsect. *Vesicularia*) 1851.

H. conostegum C. Müll., *l. c.* 242 (sect. *Omalia*, subsect. *Vesicularia*) (synon. et habitat. portoric. excl.) 1851.

Ectropothecium flavoviride Mitt. Musc. Austr.-Amer. 518. 1869; Jaeger, Adumbr. **2**: 534. 1879; Paris, Index Bryolog. 81. 1895.

E. conostegum (C. Müll.) Mitt. Musc. Austr.-Amer. 519. 1869; Jaeger, Adumbr. **2**: 537 (Brideli syn. et habitat portoric. excl.) 1879; Paris, Index Bryolog. 79 (Brideli syn. et habitat. portoric. excl.) 1895.

E. Poeppigianum (Hampe) Jaeger, Adumbr. **2**: 534. (Mitteni syn. et Lindigi planta excl.). 1879.

Vesicularia conostega C. Müll. Hedwigia, **37**: 252. 1898.

Monoicum, fusco- vel flavo-viride, laxe et depresse caespitosum, caespitibus intricatis mollibus, caule repente praelongo flexuoso inferne radiculoso irregulariter pinnato vel raro hic illic subbipinnato, ramis inaequalibus ad 7 mm. longis simplicibus vel raro parce et vage ramosis patulis vel patentibus distichis haud complanatis cum foliis circ. 1.5 mm. latis, foliis caulinis erecto-patentibus imbricatis saepe apice parum uncinatis vix compressis siccitate inflectentibus dorsalibus et lateralibus oblongo- vel ovato-acuminatis circ. 1.5 mm. longis acumine longo tenui flexuoso saepe recurvo lateralibus basi inaequalibus cellulis firmiusculis superioribus hexagonis et subhexagonis 50 — 70 × 12 — 15 μ inferne longioribus rectangulo-subhexagonis utriculo primordiali contracto repletis margine nisi in acumine minutissime subdenticulato integerrimo interdum ad folii medium recurvo nervis binis brevibus plerumque inaequilongis, foliis caulinis ventralibus minoribus circ. 1 mm. longis e basi late ovali vel subquadrata abruptius tenuiter acuminatis tenerius areolatis cellulis hexagonis et elliptico-subhexagonis 40 — 70 × 13 — 15 μ, foliis rameis haud complanatis multiseriatis vix compressis erecto-patentibus imbricatis saepe plus minus uncinatis dorsalibus et lateralibus circ. 1 mm. longis ovatis vel oblongis sensim acuminatis lateralibus angustioribus ovato-lanceolatis basi saepe inaequalibus, acumine fragili plus minus longe producto, margine in folii summo apice minutissime denticulato alibi integro cellulis superioribus firmiusculis hexagonis et subhexagonis 45 — 60 × 12 — 15 μ marginalibus in folii parte superiore latis omnibus utriculo primordiali contracto repletis nervis binis brevibus distinctis, foliis rameis ventralibus minoribus nunc e basi concava oblonga vel ovata lanceolatis nunc oblongis vel ovatis plus minus longe acuminatis (in rami parte inferiore saepe subulato-acuminatis acumine curvato) margine subintegro tenerius areolatis cellulis hexagonis et subhexagonis circ.

40 — 60 × 13 — 15 μ nervis binis brevibus, foliis perichaetialibus erectis superioribus apice flexuosis e basi oblongo-ovata truncata filiformi-acuminatis laxe reticulatis margine integro vel subintegro, capsula in pedunculo gracili subflexuoso purpureo glabro 1.5 cm. alto apice incurvo parvula 1.25 × 0.75 mm. badia suburceolata pendula, operculo turgide conico acutiusculo, "peristomii dentibus interni ciliis binis."

Hab. — *Amer. austr.* — Peruvia; sylvae primaevae, Cuchera, c. fr. (leg. Poeppig, 1829), Poeppig, Musci frondosi *no. 12* (Herb. Hamp.)! Andes peruvianae (Spruce)!

Ind. occid. — Cuba, ad truncos putridos in sylvis (Wright, *no. 120*, sub *Hypno Montagnei* Schimp., partim, = *E. flavoviride* Mitt. in herb. Mitten. et = *Hypnum conostegum* C. Müll. in herb Müller). Cuba, Döring in Hb. Kunzeano. Sept. 25, 1843 (sub. *Hypno conostego* C. Müll. in herb. Müller). St. Domingo, in monte "Isabel de la torre," 600 m. alt., June 3, 1887, leg. Eggers (sub *H. conostego* C. Müll. in herb. Müller).

Hampe in 1844 described the present plant, from examples collected by Poeppig in Peru, as *Hookeria Poeppigiana*. Müller in the "Synopsis" placed the moss in the genus *Hypnum* — section *Omalia*, subsection *Vesicularia* — between *H. rutilans* and *H. vesiculare*, and contrasted it with the latter species. In 1869 Mitten (Musci Austro-Amer. 518) without seeing specimens of Hampe's plant, quoted "*Hookeria Poeppigiana*" as a synonym of *Ectropothecium vesiculare*, and since this date authors have, almost without exception, followed Mitten in referring Hampe's plant from Peru to Schwaegrichen's species, *E. vesiculare*, from Jamaica. Jaeger (Adumbr. **2**: 534), who maintains Hampe's species and who was the first to place it in *Ectropothecium*, gives the reference "*Ectropothecium vesiculare* forma Mitt. Musc. Austr. Amer. p. 518," this, however, is incorrect, the word "forma" not occurring in the place cited. Jaeger quotes as a locality for the species "Nova Granada, in silvis ad flumen Magdalenae (*A. Lindig*)." There are examples of this plant in Hampe's herbarium, labelled in Hampe's handwriting, "*Hypnum Poeppigianum*," from "Nova Granata, ad flum. Magdalenae, December, 1862 in sylvis leg. A. Lindig." This moss, however, is certainly not the same species as is represented by Hampe's type-specimens from Peru, but belongs clearly to *E. amphibolum* Spruce. The same is the case with another moss in Hampe's herbarium labelled "*Hypnum callidum* Mont.

Chile; Huallagua super in arboribus ad Missionem Tocache Jul. 1830 Poeppig." On the label has been written in Müller's handwriting "= *Hookeria Poeppigiana* Hampe," and "= *Leskea rutilans* Brid. nach Originalexempl."

Further, there is a moss in Hampe's herbarium labelled "Musc. Andini Amazonici 1155 zu 1144. *Hypnum glaucosum* C. Müll. n. sp. *Ectropothecium subdenticulatum* Mitt. non C. Müll. Andes Peruvianae." An examination of the specimen, which consists of a few stems only, shows that there is a mixture of two species here, one being Hampe's *Hookeria Poeppigiana* — the plant agreeing in every way with Hampe's type; while the other is *E. amphibolum* Spruce.

In 1851 Müller published as a new species, in the section *Omalia*, subsection *Vesicularia*, of *Hypnum*, a plant from Cuba, (collected by Döring) under the name of *H. conostegum*, placing it, with the single species *H. subdenticulatum* in the section "Folia denticulata, longe acuminata," whilst *H. Poeppigianum* was placed in the section "Folia integerrima, breviter acuminata." The following description was given: "*monoicum; H. subdenticulato* simillimum, sed *irregulariter* pinnatum, ramis *siccitate distincte curvatis flexuosis tenerioribus subcontortis lutescentibus hic illic fuscidulis*, humore patentibus; folia obsolete denticulata saepe integerrima; pedunculus, theca et peristomium *H. Pöppigiani;* operculum *turgide conicum acutum.*" I have seen the type-specimen, labelled "*Hypnum conostegum* n. sp. Cuba: Döring in Hb. Kunzeano 25.9.1843," in Müller's herbarium. It is clearly the same plant as Hampe's *Hookeria Poeppigiana*, agreeing perfectly in habit, color, areolation and other leaf-characters.

These Cuban examples agree with certain specimens of the var. *Poeppigianum* in Bescherelle's herbarium, labelled "Peruv. Andes; Cocheras, Poeppig," in showing a variation in the shape of some of the branch-leaves which point out clearly the passage to *E. vesiculare* type. In Hampe's plant, as well as in Müller's type-specimens of *H. conostegum*, the dorsal and lateral leaves of some branches are more or less long-acuminate, while in other branches *of the same stem* these leaves (in the upper part of the branch) are broadly ovate and short- and abrupt-acuminate,— or even apiculate-acuminate, with slightly laxer areolation.

Two other examples of "*H. conostegum*" occur in Müller's herbarium. The first, which is labelled "*Hypnum conostegum* C. M. Cuba, decayed logs in forests, Wright n. 120 = *H. Montagnei* Sch. ex C. M.," quite agrees with the plant collected in Cuba by Döring, and, like that, often shows an approach in the shape of the branch-leaves to *E. vesiculare* type. It is of interest to note, however, that the main stem of some of these specimens is often thick, especially towards the apex, and that the apex of the branches is often incurved, and also that the points of the dorsal and lateral leaves of both stem and branches are slightly decurved, so that the stems have a very different appearance viewed from above and below.

The second example is labeled "*H. conostegum* m. St. Domingo in monte 'Isabel de la torre,' 600 m. alt. 3.7.87 leg. Eggers." This also has rather thick stems, with the points of the leaves decurved. It is, however, like the other example, clearly the same plant as Hampe's *Hookeria Poeppigiana*, in the type-specimen of which the same leaf-characters are sometimes observable.

With regard to the shape of the operculum — "operculum *turgide conicum acutum*" — advanced by Müller as a distinguishing character, it may be noted here that, as Montagne (in La Sagra, Hist. Cuba, Bot. 532) has already pointed out, the operculum of the present plant is *in the dry state* apiculate or mucronate, but becomes conical acuminate *on being moistened* ('operculum in statu sicco plus minus longe apiculatum vel mucronatum, humecto vero conico-acuminatum'). The FIGURES 19 and 20 which I have given on PLATE 14 show the change which takes place in the shape of the operculum.

It must be noted here that Müller quotes in the Synopsis, under *H. conostegum* the locality "Portorico: Bertero," and remarks "*Leskea* (*Omalia*) *rutilans* β *Portoricensis* Brid. 11, p. 332 e spec. imperfectis Hb. Brid. forma flaccidior videtur." I have seen the type of Bridel's plant above referred to; — the sheet bears the label, in Bridel's handwriting, "*L. Omalia rutilans* β *Portoricensis* Bryol. Univ. *Pterigophyllum pendulum* N. *L. Omalia Portoricensis* Bryol. Univ. In Porto Ricco ad saxa et arbor. Balbis Lyon 1820." On the sheet, above the specimens, Müller has written "*Acosta conostega* mihi videtur." Now this plant of Bridel's from Porto Rico, of which a fair, fruiting example still exists in his her-

barium, is certainly not Müller's *H. conostegum*, but it is identical with *E. amphibolum* Spruce.

Mitten, in 1869, in Musc. Austr.-Amer. 518, published, as a new species "*Ectropothecium flavoviride*. Ins. Cuba, Wright, n. 120, ex parte." I have examined the type in Mitten's herbarium, and find that it agrees well with Hampe's *H. Poeppigiana*. Whilst clearly belonging, in my opinion, to this, it is somewhat marked in possessing long-acuminate and rather narrow leaves, and in having the margin of the dorsal branch-leaves recurved at the middle of the leaf. The ventral branch-leaves in Mitten's type are frequently subulate-acuminate. In some of the branches of the type-specimens of *H. Poeppigiana*, however, the ventral branch-leaves are of exactly the same shape (while on other branches they are simply acuminate), and occasionally, also, the margins of the dorsal branch-leaves are recurved.

Part of the specimen in the Kew Herbarium under the *no. 120* in Wright's Cuban Mosses is the same plant as Mitten's *E. flavoviride*.

The present plant, described by Hampe as *Hookeria Poeppigiana*, certainly presents characteristics which might lead us at first sight to suppose that it was specifically distinct from *E. vesiculare*. These characteristics are the more robust habit (shown in Hampe's figure), the pale color, the longer stems with less patulous branches which sometimes bear secondary branchlets, and especially the different shape and arrangement of the branch-leaves. In the present plant the dorsal and lateral branch-leaves are usually longer, narrower, more acuminate and with firmer areolation than in *E. vesiculare*, and the branch-leaves are more crowded and arranged in many rows, so that the branches present a very different appearance from the complanate branches of *E. vesiculare* type, with their marked subdistichous arrangement of dorsal and lateral branch-leaves. As pointed out above, however, we find both in authentic specimens of *Hookeria Poeppigiana* from Peru, and of *Hypnum conostegum* from Cuba, some stems showing characters which clearly point to too close an affinity with *E. vesiculare* to allow of the present plant being given more than a varietal rank.

From all forms of the variable *E. amphibolum*, Spruce, *E. vesiculare Poeppigianum* may be at once distinguished by the less

denticulate dorsal and ventral branch-leaves, with wider marginal cells towards the apex of the leaf, and by the wider areolation of the ventral branch-leaves. I have not seen the peristome of the present plant, and have therefore, in the diagnosis given above, copied the description given by Hampe in Müller's Synopsis.

It would appear from the figure given by Montagne that the Cuban "*Hypnum Montagnei*" is *E. vesiculare Poeppigianum*, although the specimen in the Kew Herbarium, from Montagne's herbarium, is certainly *E. vesiculare* type (see above). It may be noted that Paris (Index Bryolog. 84) cites wrongly the reference "Mont. in Hist. Cuba, Crypt. p. 530, t. 20, f. 1" for the true *E. Montagnei* (Bel.) Jaeger. The latter species, from authentic specimens I have seen, is distinct from *E. vesiculare* — although evidently closely allied — in the more robust habit, the branches with more densely arranged leaves, and in the branch-leaves being of a different shape, hamate at the apex, and with different areolation; the ventral branch-leaves, also, are wider and more suddenly acuminate.

E. crassicaule Mitt. is — as the type-specimen in Mitten's herbarium shows — different from all the plants described above, and presents the following characters. The plant is straw-colored, with here and there branches showing a rich fuscous tinge of color; the stem is closely pinnate, with branches of unequal length which are usually curved at the apex. The stem-leaves are very crowded, and seen from the dorsal side of the stem are imbricate in several rows. They are gradually long-acuminate from a truncate broadly ovate or oblong base, the acumen is long, fine and flexuous, the margin is entire (with the marginal cells very distinct) except in the acumen, where it is obscurely and minutely denticulate, or subentire. The areolation is lax, with hexagonal or elongate-subhexagonal cells, the walls of which become subporose. The ventral stem-leaves are smaller and wider, and the cells have thinner walls. They are suddenly acuminate from a subquadrate or broadly oblong truncate base; the acumen is long and usually filiform, and is often flexuously contorted. The points of all the stem-leaves are regularly hamate, being curved towards the ground. The branch-leaves are crowded, and strongly hamate; the dorsal branch-leaves are lanceolate and ovate-lanceolate, attenuated to a fine acumen; the margin is entire below, minutely

denticulate above; the cells are lax, and hexagonal in shape. The ventral branch-leaves are smaller, and more abruptly acuminate from a broadly oblong or subquadrate base; the cells are more delicate, hexagonal in shape, but longer; the acumen is long and fine. Seta about 2 cm. long; capsule pendulous. The habit is very *hypnoid* (as in other species of *Ectropothecium*), and in the regularly hamate leaves, all turned in one direction (so that the dorsal surface of the stem and branches has a smooth or almost glossy appearance, while viewed from below the stem and especially the branches bristle with the flexuose arcuate points of the leaves) the plant recalls such a species as *Hypnum cupressiforme*.

Mitten's type is labeled "120 *Hypnum Montagnei* Schimp. in Mont. Crypt. Cub. p. 530, t. 20. Hab. decayed logs in forests. Cuba, Wright, ex parte."

In the Kew Herbarium part of the specimens under the *no. 120* in Wright's Cuban Mosses belongs to *E. crassicaule* Mitt., and agrees with the type in every way except that many of the dorsal branch-leaves are a little broader, being ovate-acumiate instead of lanceolate.

Explanation of plates 13 and 14

PLATE 13

FIG. 1. *Ectropothecium vesiculare* (Schwaegr.) Mitt., ventral branch-leaf, × 68. FIG. 2. Areolation of same at ⅓ from the apex, × 400. FIG. 3. Areolation of a dorsal branch-leaf at ⅓ from the apex, × 400. (*Figs. 1–3* drawn from the plant in Wright's Cuban Mosses, *no. 120*, in the Kew Herbarium.)

FIG. 4. *E. amphibolum* Spruce, ventral branch-leaf, × 68. FIG. 5. Areolation of same at ⅓ from the apex, × 400. FIG. 6. Areolation of a dorsal branch-leaf at ⅓ from the apex, × 400. (*Figs. 4–6* drawn from the plant in Spruce, Musc. Amazon. et And., *no. 1145*.)

FIG. 7. *E. vesiculare* (Schwaegr.) Mitt., apex of a dorsal branch-leaf, × 255. FIG. 8. A ventral branch-leaf, towards the base of the branch, × 52. FIG. 9. Perichaetial leaf, × 25. (*Figs. 7–9* drawn from the type in Schwaegrichen's herbarium.)

PLATE 14

FIGS. 10, 11. *E. vesiculare* (Schwaegr.) Mitt., a dorsal and a lateral branch-leaf, × 52. FIG. 12. Areolation of the apical part of the same dorsal branch-leaf, × 400. (*Figs. 10–12* drawn from the type in Schwaegrichen's herbarium.)

FIG. 13. *E. amphibolum* Spruce; marginal areolation of a lateral branch-leaf at ¼ from the apex of the leaf, × 255 (drawn from the plant in Spruce Musc. Amazon. et And., *no. 1148*.)

FIGS. 14, 15. *E. vesiculare Poeppigianum* (Hampe), a dorsal and a lateral branch-leaf, × 52. FIG. 16. Marginal areolation of a dorsal branch-leaf at ¼ from the apex of the leaf, × 255. (*Figs. 14–16* drawn from the type in Hampe's herbarium.)

FIGS. 17–22. *E. vesiculare* (Schwaegr.) Mitt.; 17, 18, two stem-leaves, from the superior side of the stem, × 52; 19, capsule, in moistened state, × 25; 20, operculum, dry, × 25; 21, part of inner peristome, × 150; 22, cilia of same, × 255. (*Fig. 19* drawn from the plant in Wright's Cuban Mosses, *no. 120*, in the Kew Herbarium; *figs. 17, 18, 20–22* from the type in Schwaegrichen's herbarium.)

The Polyporaceae of North America — VII. The genera Hexagona, Grifola, Romellia, Coltricia and Coltriciella

William Alphonso Murrill

In the last article of this series (Bull. Torrey Club, **31** : 29–44. 1904), the tough, wood-loving, central-stemmed polypores were discussed under the genus *Polyporus*. The genus *Hexagona* is in general readily distinguished from *Polyporus* by its lateral stem and peculiar pores, but the two genera approach very near to one another in some of their forms. Species of *Grifola* are large, fleshy to tough and much branched, usually growing at the bases of trees or arising from buried wood. The genera *Romellia*, *Coltricia* and *Coltriciella*, although belonging to the brown-fleshed section, are conveniently introduced here because their species are stipitate and are ordinarily associated with the stipitate forms already discussed. This latter group, moreover, is indirectly related to *Grifola* through the genus *Romellia*, with its hyaline spores, large, irregular pileus and thick, rather fleshy substance.

HEXAGONA Poll. Pl. Nov. 35. *pl. 2, 3*. 1816.

This genus was founded upon *Hexagona Mori*. The genus *Favolus* was based on *Favolus hirtus*. Both genera are monotypic in origin. Unfortunately the two were interchanged by Fries, who was unfamiliar with the species, and they have been improperly used ever since. In the Systema, Fries followed Beauvais and included *Hexagona* under the subgenus *Favolus* of *Polyporus*. In the Epicrisis, Fries includes *F. hirtus*, Beauvais' type, in the genus *Hexagona* and follows it with *H. Mori*, Pollini's type. He then begins his genus *Favolus* with *F. europaeus*, a synonym of *H. Mori*.

The genus *Hexagona* comprises species with radially elongated pores having normally six angles. In some species, the usual form of the pores is not so evident, but general appearance and habit serve to indicate generic limits. The line of demarcation between this genus and *Polyporus* is difficult to draw. Most of the species of *Hexagona* are laterally stipitate or almost sessile, but

some of them vary to centrally stipitate forms and a few species are regularly mesopous. All grow upon dead wood and agree closely in habit and host plants. One American species is common also in Europe, the others are limited to either temperate or to tropical regions of America. Many of them are very imperfectly known.

Synopsis of the North American species

1. Tubes unequally hexagonal, the radial walls longer. 2.
   Tubes equally hexagonal 15.

2. Pileus white or nearly so. 3.
   Pileus purple or brown. 12.

3. Surface of pileus glabrous or minutely hairy or fibrillose, not distinctly hispid or tomentose. 4.
   Surface of pileus distinctly hispid or tomentose. 9.

4. Pileus reniform at maturity, stipe usually much reduced; species not tropical. 5.
   Pileus flabelliform, stipe usually very distinct, equalling the pileus at times in length; species tropical. 6.

5. Tubes large, surface of pileus decorated with imbricated reddish-brown fibrils, which disappear with age. 1. *H. alveolaris.*
   Tubes much smaller, the mouths rarely over 1 mm. long and 0.5 mm. broad, surface of pileus glabrous. 2. *H. micropora.*

6. Tubes of medium size; pileus large and tough, margin not ciliate. 3. *H. daedalea.*
   Tubes large, mouths 1–2 mm. broad and 3–5 mm. long. 7.

7. Margin much lobed and fissured at maturity. 4. *H. Wilsonii.*
   Margin entire. 8.

8. Pileus small, 5 cm. in breadth. 5. *H. hispidula.*
   Pileus large, 10 cm. in breadth. 6. *H. princeps.*

9. Surface not tessellated. 10.
   Surface tessellated. 11.

10. Tubes large, the mouths 1 x 4 mm., becoming radially confluent and gill-like; context only partially translucent. 7. *H. fragilis.*
    Tubes small, the mouths about half as large as in the preceding and not becoming confluent; context thinner, wholly translucent. 8. *H. floridana.*

11. Pileus small, thin and fragile, the surface minutely checkered. 9. *H. tessellatula.*
    Pileus large, thick and firm, the surface coarsely checkered. 10. *H. caperata.*

12. Pileus purple or purplish-brown, stipe lateral or excentric. 13.
    Pileus brown, stipe distinctly central. 14.

13. Tubes merulioid. 11. *H. brunneola.*
    Tubes of normal length. 12. *H. purpurascens.*

14. Margin entire. 13. *H. portoricensis.*
    Margin ciliate. 14. *H. hondurensis.*

15. Pileus purple.	15. *H. indurata.*
Pileus yellow or brown.	16.
16. Margin papulose.	16. *H. cucullata.*
Margin not papulose.	17. *H. Taxodii.*

1. **Hexagona alveolaris** (DC.).

Merulius alveolaris DC. Fl. Fr. **6**: 43. 1815.
Hexagona Mori Poll. Pl. Nov. 35. *pl. 2, 3.* 1816.
Boletus arcularius Schw. Syn. Car. 69. 1818.
Cantharellus alveolaris Fr. Syst. Myc. **1**: 322. 1821.
Favolus canadensis Kl. Linnaea, **7**: 197. 1832.
Favolus europaeus Fr. Epicrisis, 498. 1838.
Favolus ohiensis Berk & Mont. Syll. Crypt. 171. 1856.
Favolus alveolaris Quél. Enchiridion, 185. 1886.—Fairman, Proc. Rochester Acad. Sci. **2**: 162. 1895.

This common and widely distributed species has been several times described, the earliest name having been assigned to specimens from Europe. No mention is made of the American plant in the description of *M. alveolaris* from southern France. The plant was apparently known to Fries under its earliest name in 1821, but in 1838 he redescribed it under the name *Favolus europaeus*, even the genus being different. *F. canadensis* was described from a single specimen in Hooker's herbarium. The excellent description of *F. ohiensis* was drawn from several specimens sent from Columbus, Ohio, by Sullivant. In addition to the names listed above, the species has been reported under several others, notably *F. Boucheanus* Kl. (Linnaea, **8**: 316. *pl. 5. f. 2.* 1833) and *F. alutaceus* Berk. & Mont. (Ann. Sci. Nat. Bot. III. **11**: 240. 1849). The former was originally collected by Bouché on dead trunks of birch at Lankwitz near Berlin. The latter was described from Bahia, Brazil, and probably does not extend even into tropical America. Faded specimens of *H. alveolaris*, collected especially in the South during late autumn or winter, resemble the Brazilian species in some ways, but authentic plants show them to be very distinct. Var. *peponinus* B. & C. of *F. Boucheanus* was doubtless based on these same faded forms of our common species.

In the exsiccati listed, only American material is considered. The species grows upon dead wood, usually fallen limbs, of vari-

ous deciduous trees. In New York it appears to be most common on species of hickory: Canada, *Dearness, Macoun;* New Hampshire. *Lobenstine;* Connecticut, *White, Earle;* New York, *Underwood, Clinton, Brown, Murrill, Overacker, Earle;* Pennsylvania, *Haines, Everhart;* New Jersey, *Ellis;* Ohio, *James, Morgan;* Virginia, *Murrill;* Georgia, *Ravenel;* Alabama, *Earle;* Michigan, *Hicks, Johnson;* Wisconsin, *Calkins;* Montana, *Anderson.*

2. **Hexagona micropora** sp. nov.

Pileus flabelliform to reniform, convex, usually umbilicate or depressed behind, 2–4 × 2.5 × 0.2–0.4 cm.; surface smooth, glabrous, straw-colored to cream-colored, margin acute, undulate or slightly lobed, rarely reflexed, irregularly denticulate, dark brown, as if scorched: context white, 1–2 mm. thick; tubes decurrent, ochraceous, 1–2 mm. long, mouths 4–6 angled, 0.3–0.5 × 0.6–1 mm., edges rather firm, beset with small, sharp teeth; spores ellipsoidal, smooth, hyaline, 3 × 9 μ; stipe lateral to excentric, slightly enlarged below, concolorous, minutely tomentose to subglabrous, 1–7 mm. long, 3–5 mm. thick.

The type plants of this species were collected by Miss V. S. White on a dead birch tree at Bar Harbor, Maine, August 4, 1901. Other collections are at hand from Ohio, *Kelsey;* New York, *Britton;* New Jersey, *Ellis;* Wisconsin, *Baker.* Specimens were also found in the Fries herbarium at Upsala sent from New York by Peck. In habit and general appearance it resembles *H. alveolaris,* but it is much rarer and seems confined to the northern states, while the glabrous surface and very much smaller tubes easily distinguish it from that species.

3. **Hexagona daedalea** (Link)

Merulius daedaleus Link, Disser. **1**: 37. 1795.
Daedalea braziliensis Fr. Syst. Myc. **1**: 332. 1821.
Favolus braziliensis Fr. Elench. Fung. 44. 1828; Linnaea, **5**: 511. *pl. 11. f. 1.* 1830.

This species was originally described from Brazil, but it extends as far north as Florida and is quite abundant in tropical America on fallen trunks and other decayed timber. Besides the synonyms cited above, there are doubtless several more recent ones assigned by those who have worked over South American material. On the other hand, some species have been treated as

forms of this one which are really distinct. *Favolus tessellatus* Mont. (Ann. Sc. Nat. II. Bot. **20**: 365. 1843), a good Brazilian species, was at first determined as *F. braziliensis* by Montagne and later separated because of its distinctly tessellated or checkered surface and regularly hexagonal pores. Cuban specimens called *F. tessellatus* are plainly *F. braziliensis*, and are so determined at Kew by Montagne.

Exsiccatae: Texas, *Wright;* Louisiana, *Hale, Langlois;* Cuba, *Underwood & Earle;* San Domingo, *Wright;* Brazil, *Telinck.*

4. **Hexagona Wilsonii** sp. nov.

Pileus flabelliform, applanate, 4–7 × 4–9 × 0.05–0.2 cm.; surface radiate-striate, slightly hispid, partially tessellate, pure white, becoming cream-colored on drying; margin at maturity very thin, usually much lobed and fissured, beset with short, fugacious hairs: context fleshy-tough, membranous, white, partially or wholly translucent; tubes decurrent, white, 1–2 mm. long, 4–6 angled, mouths 1.5 × 5 mm., smaller near the margin, edges very thin, splitting into irregular teeth; spores ellipsoidal, smooth, hyaline, 5 × 10 μ; stipe exactly lateral, equal, concolorous, hispid, 0.5–1 cm. long, 2.5–5 mm. thick, often umbilicate above where it expands into the pileus.

This elegant species was collected by Percy Wilson (*no. 317*) in July, 1902, in the Luquillo mountains, Porto Rico, three miles from the coast. Decaying logs along a mountain stream were found covered with the fruit-bodies.

5. **Hexagona hispidula** (B. & C.)

Favolus hispidulus B. & C. Jour. Linn. Soc. Bot. **10**: 321. 1868.

Collected on trunks in Cuba by Wright.

6. **Hexagona princeps** (B. & C.)

Favolus princeps B. & C. Jour. Linn. Soc. Bot. **10**: 321. 1868.

Collected on dead wood in Cuba by Wright. The type is at Kew. It is a large, handsome species.

7. **Hexagona fragilis** sp. nov.

Pileus flabelliform, convex, depressed behind, 2–3 × 2–4 × 0.1–0.3 cm.; surface densely hispid, especially behind, faintly radiate-striate, pure white, becoming straw-colored in drying; margin

quite thick for the genus, nearly regular in outline, usually inflexed when dry, partly hygrophanous at times, beset with short, fimbriate, fugacious hairs: context thin, white, partially translucent, quite fragile when dry; tubes decurrent, white, 2–3 mm. long, 4–6 angled, mouths 1 × 4 mm., becoming radially confluent and gill-like, edges thin, lacerate, the divisions fimbriate; spores ellipsoidal, smooth, hyaline, 4–5 × 10 μ; stipe lateral, subequal, concolorous, hispid, short, 5 mm. long, 2.5 mm. thick, rarely umbilicate above.

About twenty specimens of this plant were collected by Earle (*no. 585*) during a recent visit to Jamaica. They were found on fence-posts made of "star-apple" (*Chrysophyllum*).

8. **Hexagona floridana** sp. nov.

Pileus flabelliform, applanate, depressed behind, 2 × 2.5–3 × 0.2 cm.; surface finely hispid, pure white becoming straw-colored on drying, faintly radiate-striate; margin slightly undulate, tessellate at times, fringed with numerous slender cilia: context very thin, white, membranous, wholly translucent; tubes decurrent, white, becoming ochraceous, 1.5–2 mm. long, normally hexagonal, mouths 0.5–1 × 2–3 mm., not radially confluent, edges thin, fimbriate; spores ellipsoidal, smooth, hyaline, 9 × 4 μ; stipe lateral, subequal, scutate at the base, concolorous, hispid, 2–5 mm. long, 1–2 mm. thick, always umbilicate above.

This species was collected by Small & Wilson near Miami, Florida, May, 1904. About thirty sporophores in various stages of development were taken from an old decaying log in rich shady woods.

9. **Hexagona tessellatula** sp. nov.

Pileus flabelliform, convex, depressed behind, 1–3 × 2–4 × 0.2 cm.; surface delicately and closely tessellate, finely hispid, becoming glabrous, white, yellowish when dry; margin thin, denticulate, slightly incurved when dry, frequently brown and hygrophanous: context white, membranous, translucent; tubes decurrent, white, 2 mm. long, 4–6 angled, mouths 1 × 3 mm., at length radially confluent, edges thin, lacerate; spores ellipsoidal, smooth, hyaline, 2-guttulate, 3 × 10 μ; stipe lateral, short, slightly enlarged below, concolorous, hispid, 3–5 mm. long, 2–3 mm. thick, usually umbilicate above.

This species was recently collected on dead wood in Cuba by Underwood and Earle (*no. 1212*). About twenty fruit-bodies were preserved.

10. **Hexagona caperata** (Pat.)

Favolus caperatus Pat. Bull. Soc. Myc. **18**: 171. 1902.

Described from Guadeloupe collections. Easily recognized by the abundant villosity which covers the cap. Plants recently collected by Earle at Port Antonio, Jamaica, agree well with the description.

11. **Hexagona brunneola** (B. & C.)

Favolus brunneolus B. & C. Jour. Linn. Soc. Bot. **10**: 321. 1868.

Collected on dead wood in Cuba by Wright. One small specimen is at Kew. The tubes are merulioid in their brevity, the dissepiments being mere lines. I was at first inclined to consider the species an undeveloped stage of *H. purpurascens*, but the two species were originally described at the same time and declared by their authors to be most distinct.

12. **Hexagona purpurascens** (B. & C.)

Favolus purpurascens B. & C. Jour. Linn. Soc. Bot. **10**: 321. 1868.

Collected by Wright on trunks in Cuba. Easily distinguished from most other species by its purple color.

13. **Hexagona portoricensis** sp. nov.

Pileus centrally stipitate, circular, deeply umbilicate, × 4 0.3 cm.; surface subglabrous, umbrinous, the centre concolorous; margin entire, not very thin, much inflexed when dry: context white, fibrous, 1 mm. thick, opaque; tubes somewhat decurrent, white, 2 mm. long, 4–6 angled, mouths 1 × 3 mm., smaller and more regular near the margin, edges thin, fimbriatulate; spores ellipsoidal, smooth, hyaline, 2-guttulate, 3–5 × 8–10 μ; stipe central, compressed, slightly tapering downward, subconcolorous, minutely tomentose, 2 cm. long, 4 mm. thick.

The above description is based on *no. 145* of Earle's Porto Rican collections. The plant was found upon decaying wood in the mountains at an altitude of 2,000 feet. It has many characters in common with *H. hondurensis.*

14. **Hexagona hondurensis** sp. nov.

Pileus centrally stipitate, circular, slightly umbilicate, 2–4 × 0.05 cm.; surface faintly radiate-striate, subglabrous, fulvous, the center fuliginous; margin thin, regular, tessellate, inflexed when

dry, fringed with numerous short, fugacious cilia: context white, fibrous, 0.25 mm. thick, translucent near the margin; tubes adnate, white, 0.3 mm. long, hexagonal, radially elongated, mouths 1 × 2 mm., much smaller near the margin, edges thin, subentire; spores ellipsoidal, smooth, hyaline, 3.5 × 9 μ; stipe central, equal, concolorous, pruinose to glabrous, 2–3 cm. long, 2 mm. thick.

This species is described from plants collected in Honduras by Percy Wilson (*no. 640*) March, 1903. They grew on dead logs by the shore of a lagoon not far from the coast. All stages are represented.

15. **Hexagona indurata** (Berk.)

Favolus induratus Berk. Ann. Nat. Hist. II. **9**: 198. 1852.

Collected on wood in San Domingo. The type plants are at Kew. If the tubes alone were considered, this species would belong rather with *Favolus*. It differs from *H. cucullata* in having larger tubes, and being purple in color.

16. **Hexagona cucullata** (Mont.)

Favolus cucullatus Mont. Pl. Cell. Cuba, 378. *pl. 14. f. 2.* 1842.

Montagne's type from Cuba is well described and figured in the work cited. Although the tubes are regularly hexagonal, it seems best to place the species in *Hexagona* because of general appearance, structure and habit. Berkeley considered *Favolus curtipes* B. & C. (Kew Misc. **1**: 234. 1849) a synonym of Montagne's species, remarking that plants collected in San Domingo exactly connect the Cuban species with that described from South Carolina.

17. **Hexagona Taxodii** sp. nov.

Pileus reniform, applanate, umbonate-sessile, 3–6 × 6–8 × 0.2 cm.; surface glabrous, radiate-striate, cream-colored to ochraceous, marked with two or three broad undulations from center to margin, which is thin, entire, irregularly undulate or lobed and deflexed when dry: context tough, white, homogeneous, 0.5 mm. thick; tubes dark fulvous, hexagonal, not radially elongated, 1.5 mm. long, 1 mm. wide, edges thin, finely denticulate; spores ellipsoidal, smooth, hyaline, 14 × 7 μ, copious; stipe a mere scutate disk nearly a centimeter in breadth.

The type collection of this species was made by Small & Wilson near Miami, Florida, May, 1904. The sporophores were

found a few feet from the ground on a decaying standing trunk of cypress (*Taxodium distichum*) in damp rich woods near the Miami river. Other plants were collected near the type locality by Mr. McCullough of the Miami Experiment Station.

SPECIES INQUIRENDAE

Favolus Friesii B. & C. Jour. Linn. Soc. Bot. **10**: 321. 1868. First collected on decayed wood at San José, Costa Rica, and called *Favolus lacerus* by Fries, who later (Nov. Symb. 104. 1851) assigned it to *F. flaccidus* Fr. (Linnaea, **5**: 511. 1830), a species collected in Brazil by Beyrich, in whose herbarium it was called *Cantharellus aequinoctialis* Link. The original name was changed by Berkeley and Curtis because of *Favolus lacerus* Lév., described from Java. The Cuban plant at Kew seems only a form of *H. daedalea*, but it is very likely that the one from Costa Rica is different.

Favolus curtipes B. & C. Hook. Jour. Bot. **1**: 234. 1849. "Pileus reniform, two inches broad, one and one-half inches long, quite smooth, rigid, and tawny when dry. Stem extremely short, disciform. Pores one-thirty-sixth of an inch broad, pale, undulated, and crisped; edge white." Said by the authors to differ from *F. cucullatus* Mont. in having less rigid and smaller pores and more fleshy substance.

Favolus guadalupensis Lév. Ann. Sc. Nat. III. Bot. **5**: 144. 1846. Collected on trunks in Guadeloupe by L'Herminier. Infundibuliform specimens of *H. daedalea* agree fairly well with the description of this species.

Favolus velutipes Fr. Nov. Symb. 104. 1851. Collected by Oersted at San José, Costa Rica. Pileus fan-shaped, smooth, ferruginous; stipe very short, pubescent.

GRIFOLA S. F. Gray, Nat. Arr. Brit. Pl. **1**: 643. 1821.

Polypilus Karst. Rev. Myc. **3**: 17. 1881.

Meripilus Karst. Bidr. Finlands Nat. och Folk. **37**: 33. 1882.

Cladomeris Quél. Enchiridion, 167. 1886.

The genus *Grifola* was founded on *Grifola frondosa* and five other species with lateral stem and semicircular cap, *i. e.*, *G. platypora*, *G. cristata*, *G. lucida*, *G. badia* and *G. varia*. Of these

last only *G. cristata* is congeneric with the type, the others belonging to *Polyporus* and *Ganoderma*. In Karsten's arrangement of the group, *P. frondosus* with *P. confluens* and *P. sulfureus* form the basis of a new genus, *Polypilus*, Gray's genus *Grifola* not being considered. So, again, Quélet establishes his genus *Cladomeris* on *P. umbellatus* and sixteen other species, ignoring the work of both Karsten and Gray.

The plants of the genus *Grifola* are large and striking in appearance and sometimes attractive in coloring. They are intricately branched or irregularly lobed, fleshy or fleshy-tough in substance, with white context and spores and large, irregular tubes, which become friable or laciniate with age. They are usually found on or near dead wood in some form, either attached to buried sticks or roots or growing close to the base of a tree trunk. This latter habitat is a favorite one for at least four members of the genus, and the tree is usually an oak.

The distribution of members of this genus is quite general. Two of our species occur also in the Eastern hemisphere and two others are represented there by nearly related plants. *G. frondosa* may be said to be abundant, *G. poripes* and *G. Berkeleyi* are fairly well known and the remaining three are rare, *G. ramosissima* being more common, however, in Europe than in America.

Owing to the difficulty of handling such large forms and the changes which they undergo in drying, many mistakes are current concerning these plants. It is not easy to gain a just conception of an entire plant from one of its minute divisions, and in this, as well as in other groups, form and habit of growth count for much. If some of the existing errors have been eradicated by these studies, there is yet much to learn with regard to known species and more concerning those whose standing is still in doubt.

Synopsis of the North American species

1. Hymenium ochraceous, becoming dirty-yellow with age, plants terrestrial, irregularly confluent, olivaceous to greenish-yellow. 1. *G. poripes.*
   Hymenium at first fuliginous, becoming paler. 2. *G. Sumstinei.*
   Hymenium white or pallid from the first. 2.

2. Surface of pileus gray or grayish-brown to coffee-colored, stipe intricately branched, pileoli very numerous and small. 3.
   Surface of pileus pallid or alutaceus, stipe not intricately branched, lobes usually few in number and comparatively large. 4.

3. Pileoli lateral, spatulate or dimidiate. 3. *G. frondosa.*
Pileoli centrally attached, circular and umbilicate. 4. *G. ramosissima.*

4. Sporophore of immense size, 20–60 cm. in diameter, spores echinulate, 8–9 μ. 5. *G. Berkeleyi.*
Sporophore small for the genus, only 8 cm. or less in diameter, spores smooth, ovoid, much smaller. 6. *G. fractipes.*

1. **Grifola poripes** (Fr.)

Polyporus poripes Fr. Nov. Symb. 48. 1851.
Polyporus flavovirens B. & Rav. Grevillea, 1: 38. 1872.

Small plants of this species from the collections of Curtis were described by Fries in 1851. Somewhat older plants were later renamed by Berkeley and Ravenel, the name referring to the very characteristic mixture of yellow and green in the plant as it develops. Most of the herbarium specimens of this species are young and do not properly show the systematic position of the plant, its relationship clearly being with *Grifola* instead of *Scutiger*. It occurs on the ground in woods, rising from a tubercle and spreading broadly in irregular lobes. The substance is eaten by insect larvae. Specimens have been examined from Massachusetts, *Blake, Ricker;* Canada, *Dearness;* New York, *Long;* Delaware, *Commons;* New Jersey, *Ellis;* Ohio, *Morgan;* Pennsylvania, *Everhart;* Virginia, *Murrill;* and Carolina, *Ravenel.* It is fairly common and always eagerly picked by collectors. A good description of it may be found in the Journal of Mycology for January, 1886. Ellis there makes some corrections in the original description of Berkeley and Ravenel.

2. **Grifola Sumstinei** sp. nov.

A very large plant resembling *G. frondosa* in habit and general appearance, but with fewer and broader pileoli, darker surface and darker hymenium. Pileus imbricate-multiplex, 20 × 30 cm., pileoli flabelliform to spatulate, 6–8 × 6–8 × 0.3–0.5 cm.; surface radiate-rugose, finely tomentose, light to dark brown; margin very thin, fissured and strongly inflexed when dry: context white, fibrous, fleshy-tough to almost leathery, 0.3 cm. thick; tubes 0.2 cm. long, 7 to a mm., at first fuliginous, becoming pallid at maturity, polygonal, irregular, edges very thin and fragile, becoming lacerate; spores globose, smooth, hyaline, thin-walled, copious, 5 μ: stipe tubercular, woody, blackish below, connate-ramose, lighter-colored, passing insensibly into the pileoli above.

This species is found about old stumps and trunks during the autumn. It has been collected three times in as many different states. Morgan determined it as *P. giganteus* Pers., a European species which it resembles in habit and coloring. His specimen from Ohio is rather small and undeveloped. A still smaller plant, only 4 cm. high, is in the Langlois collection from Louisiana. The type plants of the species, however, were sent this year to the New York Botanical Garden from Pennsylvania by Professor D. R. Sumstine. They are large and well developed and show both the immature and the mature hymenium in a highly satisfactory manner. I take pleasure in dedicating the species to Professor Sumstine.

3. GRIFOLA FRONDOSA (Dicks.) S. F. Gray

Boletus frondosus Dicks. Crypt. Brit. **1**: 18. 1785.
Polyporus frondosus Fr. Syst. **1**: 355. 1821.
Grifola frondosa S. F. Gray, Nat. Arr. Brit. Pl. **1**: 643. 1821.
Polypilus frondosus Karst. Rev. Myc. **3**: 17. 1881.

This species is commonly found at the base of oak trees. It is very large, intricately branched, fleshy to tough, and usually grayish in color. It varies considerably and has several names. The European and American forms do not appear to differ very much, and I have also been unable to distinguish it in herbarium material from such species as *P. intybaceus* and *P. anax*, the shape of the spores being rather variable and uncertain in this group. Quite a full description of the present species is given in the Journal of Mycology for January, 1886. Exsiccati are very abundant. Most European collectors have distributed it and it has been reported from nearly every state in this country, *e. g.*, Iowa, *Macbride, Fitzpatrick;* Ohio, *Morgan, Lloyd;* District of Columbia, *James;* Pennsylvania, *Everhart;* Louisiana, *Langlois;* Canada, *Dearness.* Atkinson, in his Studies of American Fungi, discusses the species at length and gives two illustrations of it from original photographs.

4. **Grifola ramosissima** (Scop.)

Boletus ramosissimus Scop. Carn. ed. 2. **2**: 470. 1772. — Schaeff. Fung. *pl. 111.* 1763.

Boletus umbellatus Pers. Syn. 519. 1801.
Polyporus umbellatus Fr. Syst. **1**: 354. 1821.
Cladomeris umbellata Quél. Enchiridion, 167. 1886.
Cladomeris ramosissima Murrill, Jour. Myc. **9**: 95. 1903.

This species closely resembles *G. frondosa* in size, habit and general structure, but the pileoli are centrally attached and circular in form instead of dimidiate and spatulate. It is likewise much rarer than *G. frondosa* both in this country and in Europe. Persoon's name seems a very appropriate one, but it is antedated by that of Scopoli. Quélet used this species in establishing his genus *Cladomeris*, a synonym of *Grifola*. In America, the plant is reported but rarely. Atkinson found it at Ithaca and refers to it in his Studies of American Fungi. Specimens are at hand from Pennsylvania, *Everhart;* Connecticut, *Underwood & Earle;* and Ohio, *Lloyd;* the last accompanied by a fine protogravure of the entire living plant.

5. **Grifola Berkeleyi** (Fr.)

Polyporus Berkeleyi Fr. Nov. Symb. 56. 1851.
Polyporus subgiganteus Berk. & Curt. Grevillea, **1**: 49. 1872.
Polyporus Beatiei Peck, Rept. N. Y. State Mus. Nat. Hist. **30**: 36. 1878.

This species was described from a single pileolus sent to Fries from Curtis' North Carolina collections. It fully warrants the expression used by Fries in describing it: "Nobilissimus inter omnes mihi cognitos Polyporos." I have seen plants two feet in width and over a foot high, with several lobes six to nine inches in diameter. They usually grow under oak trees, often between the enlarged bases of the main roots, and are in close connection with some supply of humus, either from buried wood or very rich leaf-mould. The surface of the pileus is light yellowish-brown, darker toward the center, the tubes irregular, light yellowish-brown, fragile and somewhat toothed. It is easily distinguished from its American allies by the size, color and breadth of its lobes. *Polyporus Beatiei* Peck and *Polyporus subgiganteus* B. & C. are not specifically distinct. The former was collected in Maryland and well described in manuscript by Miss Banning; the latter is represented at Kew by a single pileolus collected by Wright in Connecticut.

Specimens are at hand from Massachusetts, *Banker;* Canada, *Dearness;* Missouri, *Demetrio;* Ohio, *James, Lloyd;* West Virginia, *Nuttall;* Pennsylvania, *Everhart;* New York, *Banker;* Virginia, *Murrill.* Lloyd's photogravures 23 and 24 exhibit the appearance and habit of the living plant most accurately and beautifully. It seems fitting that this magnificent plant should be so well represented. It is also appropriate that it should bear the name of a man who has done so much for American mycology.

6. **Grifola fractipes** (B. & C.)

Polyporus fractipes B. & C. Grevillea, **1**: 38. 1872.

Little is known of this species beyond the collections of Curtis and Ravenel in South Carolina and an occasional plant reported from adjoining states. The specimens at hand are better developed than those at Kew, with older and larger pores, and show a close relationship rather with species of *Grifola* than *Polyporus.* Although the stipe is not branched in these specimens, it is distorted and tubercular at the base as though united with other pilei that were as yet immature. So far as the general structure of context and hymenium goes the species exhibits very close similarity with typical *Grifola* forms.

SPECIES INQUIRENDAE

Polyporus anax Berk. Grevillea, **12**: 37. 1883. Described from Ohio. Apparently not specificially distinct from *G. frondosa.*

Polyporus lactifluus Peck, Bull. Torrey Club, **8**: 51. 1881. Described from dried material and notes sent by Miss Banning from Maryland. It seems different from *G. Berkeleyi* only in having milky juice, a character possessed by other members of this genus and probably present in *G. Berkeleyi* in its young stages.

Romellia gen. nov.

Hymenophore large, irregular, annual, spongy to corky, epixylous; stipe simple, variously attached, surface of pileus anoderm, hispid; context ferruginous, tubes irregular, thin-walled, spores ellipsoidal, smooth, hyaline, cystidia none.

The type of this genus is *Boletus sistotremoides* Alb. & Schw., better known as *Polyporus Schweinitzii* Fr. The plant is a large and striking one, quite common in Europe and America, and has

figured under several genera since it was first described as a *Boletus*. Soon after being transferred to *Polyporus*, it was assigned to *Daedalea* because of its irregular pores, then to *Polystictus* because it seemed nearly allied to *P. perennis*. Quélet, however, overlooked this relationship and classified it under *Cladomeris* with *Polyporus frondosus*, *P. imberbis*, etc., largely on account of its hyaline spores. The species may be easily confused in some of its forms with *Polyporus hispidus*, but its normal form is stipitate, while *P. hispidus* is always dimidiate and the spores of the former are hyaline while those of the latter are of a deep golden hue. From the genus *Coltricia*, apparently its nearest ally, it differs in having hyaline spores, a more spongy context, differently colored tubes and a very variable stipe.

I take pleasure in dedicating this genus to my friend Lars Romell, the distinguished mycologist of Stockholm, Sweden.

Romellia sistotremoides (Alb. & Schw.)

Boletus sistotremoides Alb. & Schw. Conspec. Fung. 243. 1805.
Polyporus Schweinitzii Fr. Syst. Myc. **1**: 351. 1821. Icon. *pl. 179. f. 3.* 1870.
Daedalea epigaea Lenz, Schwäm. 62. 1831.
Polyporus tabulaeformis Berk. Lond. Jour. Bot. **4**: 302. 1845.
Polyporus spectabilis Fr. Nov. Symb. 48. 1851.
Polyporus hispidioides Peck, Rept. N. Y. State Mus. Nat. Hist. **33**: 21. 1880.
Polystictus Schweinitzii Karst. Rev. Myc. **3**: 18. 1881.
Cladomeris Schweinitzii Quél. Enchiridion, 169. 1886.

The description of this fungus as given by the original authors is sufficiently clear and complete and the plant is so well known as to require little comment upon its appearance and structure. On account of its exceeding variability, well-known mycologists, such as Fries, Berkeley and Peck, have been led to rename it in certain of its forms. *P. tabulaeformis*, for example, is an old plant of *P. Schweinitzii* from Augusta, Georgia, sent to Berkeley by Wray, while a similar specimen sent by Curtis from North Carolina to Fries received the name *P. spectabilis*, the type of which still exists at Upsala. Fries was deceived by the firm, corky substance and very changed aspect of the plant in its older stages.

Peck was led to separate the rather rare dimidiate form of this species found on the trunks of trees under the name *P. hispidioides*, because of its resemblance to *P. hispidus*.

All of these forms and others which have received no distinct names seem to grade imperceptibly into one another, so that their separation would seem impossible even if desirable. The plant is an illustration of one of those unsettled types found more than once in this family which are blessed with overflowing exuberance of vitality and have several ways of expressing it. Thus, for example, while it usually attacks coniferous trees it may also be found on deciduous wood; while occurring commonly on the roots or at the base of its host, it may ascend to a height of fifty feet on the trunk, and while usually central-stemmed, the stipe may be lateral or even wanting. It is a very fine, large, highly-colored plant, well-known for its destructive effects upon coniferous trees both in Europe and America. Specimens nearly two feet in diameter were collected the past summer on the roots of larch trees at Mendel Pass in the Italian Tyrol.

According to Schrenk, who has studied the species in New England, the fruit bodies appear in July and August and are greedily devoured by beetles soon after the spores are matured. During the discharge of the spores, drops of a yellow liquid were collected by him from the hymenium, which were found to contain certain fungous sugars. It is probable that these sugars have something to do with the distribution of the spores among the roots of new host plants.

Some of the localities where this widely distributed fungus has been collected are given below. It is not rare in Asia and Europe and seems even more abundant in North America: Finland, *Karsten;* England, *Plowright;* Tyrol, *Bresadola & Murrill;* Newfoundland, *Waghorne;* Canada, *Macoun;* Vermont, *Burt;* Connecticut, *White;* New York, *Earle, Peck;* New Jersey, *Ellis;* Delaware, *Commons;* Oregon, *Carpenter;* Washington, *Macbride;* South Carolina, *Shear;* Louisiana, *Langlois;* Alabama, *Earle & Baker;* Mexico, *Smith.*

COLTRICIA S. F. Gray, Nat. Arr. Brit. Pl. **1**: 644. 1821.

Strilia S. F. Gray, Nat. Arr. Brit. Pl. **1**: 645. 1821.

Polystictus Fr. Nov. Symb. 70. 1851.

Pelloporus Quél. Enchiridion, 166. 1886.
Mucronoporus Ell. & Ever. Jour. Myc. **5**: 28. *pl. 8.* 1889.
Onnia Karst. Finlands Basidsv. 326. 1889.
Xanthochrous Pat. Cat. Tun. 51. 1897.

The genus *Coltricia* was established by S. F. Gray in 1821 upon three species, *C. connata*, *C. nummularia* and *C. leptocephala*. The first, which is considered the type of the genus, is the *Boletus perennis* of Linnaeus, a well-known plant of wide distribution, placed under the genus *Polystictus* in Saccardo's Sylloge. The other two are typical species of the genus *Polyporus* in the narrowest sense. Gray placed them in *Coltricia* because they had the "stem central, cap orbicular, umbilicate, membranaceous," while important differences in structure were disregarded. The genus *Strilia*, based on *S. cinnamomea* (Jacq.), has no claim to distinction and was evidently erected through error or lack of proper material.

The genus *Polystictus*, separated as an experiment by Fries in 1851, is based on *Polystictus parvulus*, a close ally of *P. perennis*, and must therefore stand as a synonym of *Coltricia*.

The genus *Pelloporus* included *P. perennis*, *P. tomentosus* and other allied species with corky or coriaceous context, ferruginous substance and spores and terrestrial habits. The first species listed is *P. triqueter*, a wood-loving form of *P. circinatus*, in which the stipe has become lateral and rudimentary. In a former article (Jour. Myc. **8**: 95. 1903), *P. triqueter* was considered more nearly related to *P. radiatus*, which also has a spiny hymenium and grows on tree-trunks, and the genus *Pelloporus* was there treated as a synonym of *Inonotus* Karst. Since the proper position of *P. triqueter* is determined *Pelloporus* must now be considered synonymous with *Coltricia*.

The genus *Mucronoporus* was based on *M. circinatus*, *M. dualis*, *M. tomentosus* and nine other species quite different in structure from the three mentioned, but resembling them in having a spiny hymenium, which was the distinguishing feature of the genus. In observing this feature exclusively, a number of other species, as varied an assortment as the family affords, have been since added to the original twelve. The genus *Onnia*, with the same distinctive character as *Mucronoporus*, was established later in the same year upon *Onnia circinata* and *Onnia tomentosa* and

is therefore a synonym of *Mucronoporus* and *Coltricia*. As to the standing of such genera as *Hymenochaete* and *Mucronoporus*, based solely on the presence of cystidia, opinion has been divided, but a brief study of various forms will show that this character is possessed exclusively by no one group of fungi and that it varies abundantly even within the limits of a single species. It often affords a convenient clue to the identification of species, but should be accompanied by stronger and more permanent characters in the separation of genera.

The species of the present genus are terrestrial or wood-loving plants found in dry soil in woods or attached to decayed sticks or roots beneath the ground or growing at times upon much-decayed logs and stumps. Some of the species have a peculiar fondness for places where fires have been built; others are able to adapt themselves to very varied localities, growing now upon rich soil and again upon dead standing tree-trunks. In appearance, they are usually circular, central stemmed, brownish plants with rusty context and spores and a brown hymenium, which is covered with a yellowish or whitish powder when young. Cystidia are rarely present. The consistency of the pileus varies from coriaceous to spongy and the surface from concentrically zonate to smooth. As to distribution, the members of the genus are about equally divided, half of them being cosmopolitan and the other half local. The smallest plant of the group is *C. cinnamomea*, the largest *C. Memmingeri*, a new species known from one locality only.

Synopsis of the North American species

1. Pileus concentrically zonate, context thin. 2.
   Pileus azonate, context rather thick and spongy. 4.

2. Pileus shining cinnamon, strigose, striate, thin, flexible, slightly depressed, the margin often fimbriate or pseudo-ciliate. 1. *C. cinnamomea.*
   Pileus dull rusty cinnamon to hoary, velvety to glabrous, deeply depressed, the margin thicker and less fimbriate. 3.

3. Tubes small, 0.5 mm. or less in diameter. 2. *C. perennis.*
   Tubes large, 1 mm. in diameter. 3. *C. parvula*

4. Context homogeneous, hymenium free from spines. 5.
   Context duplex, soft above and woody below, hymenium beset with spines. 4. *C. tomentosa.*

5. Pileus ferruginous to fulvous, 5 cm. in diameter, surface finely tomentose, stipe swollen and soft at the base. 5. *C. obesa.*
   Pileus darker, fulvous to chocolate-colored, 10 cm. in diameter, surface rough and shaggy, stipe scutate and firm at the base. 6. *C. Memmingeri.*

1. **Coltricia cinnamomea** (Jacq.)

Boletus cinnamomeus Jacq. Collect. **1**: 116. *pl. 2.* 1786.
Strilia cinnamomea S. F. Gray, Nat. Arr. Brit. Pl. **1**: 645. 1821.
Polyporus oblectans Berk. Lond. Jour. Bot. **4**: 51. 1845.
Polyporus splendens Peck, Rept. N. Y. State Mus. Nat. Hist. **26**: 68. 1874.
Polyporus subsericeus Peck, Rept. N. Y. State Mus. Nat. Hist. **33**: 37. 1880.
Polystictus cinnamomeus (Jacq.) Sacc. Michelia, **1**: 362. 1878.—Atkinson, Stud. Amer. Fungi, 192. *f. 182.* 1900.

This species appears to be truly cosmopolitan, being found in both hemispheres in tropical as well as in temperate regions. In habitat it differs from its nearest American allies in growing more commonly on mossy soil or much-decayed wood and rather sparingly on sandy soil, thus showing a preference for almost pure humus rather than for sterile soil very poor in humus. In appearance it is small, slightly depressed, silky and shining, well deserving the name, *P. splendens*, assigned to it by Peck. Its first name, however, refers to its cinnamon color and dates back to the days of Jacquin, who received it from Westhofen in the month of September. His description plainly refers to our plant:

"Totus cinnamomeus, etiam in substantia interna. Stipes solidus, teres, villosulus, plus minus uncialis, erectus, calamo gracilior. Pileus in centro infundibuliformis, in limbo planus, lineam unam alteramve crassus, diametri uncialis, supra sericeus nitidus et ad tactum holoserici adinstar mollis, subtus poris angulatis totus refertus. Sponte ex¡ccatus colorem servat, nec putrefecit, fragilis dumtaxit evadit, et parumper limbo crispatur. Crescit inter muscas in humo udo."

Only two characters in this description need comment. While the species is usually slightly depressed, it is sometimes more or less infundibuliform, as our own plants show, and Jacquin seems to have got some of the latter kind. The term *fragilis* seems to have been incorrectly or rather freely used. Fries questions its correctness, while S. F. Gray stumbles over it into erecting the genus *Strilia*, which differs from *Coltricia* only in being fleshy instead of membranaceous.

P. oblectans was described from Australian material. Berkeley's description, though unusually complete, does not differ materially from that of Jacquin and the type plants cannot be distinguished from American specimens. Soon after Peck named the

American plant Cooke referred it to *P. oblectans*, while Peck soon discovered that *P. splendens* was preoccupied by a Brazilian species and changed the name to *P. subsericeus*.

The following American exsiccati are in the New York Botanical Garden herbarium: Canada, *Dearness;* Iowa, *Holway;* Maine, *White;* Connecticut, *Underwood & Earle;* New York, *Peck, Lobenstine, Earle, Gerard;* New Jersey, *Ellis;* Pennsylvania, *Everhart, Barbour;* Ohio, *Morgan;* West Virginia, *Nuttall;* Georgia, *Underwood, Stevenson;* Alabama, *Earle;* Colorado, *Underwood & Selby*.

2. COLTRICIA PERENNIS (L.) Murrill, Jour. Myc. 9: 91. 1903.

Boletus perennis L. Sp. Pl. 1177. 1753.—Sowerby, Eng. Fung. *pl. 192.* 1799.
Boletus coriaceus Scop. Fl. Carn. ed. 2. **2**: 465. 1772.—Bull. Herb. France, *pl. 28.* 1780.
Boletus subtomentosus Bolt. Hist. Fung. **2**: 87. *pl. 87.* 1788.
Boletus confluens Schum. Saell. **2**: 378. 1803.
Polyporus perennis Fr. Syst. Myc. **1**: 350. 1821.
Coltricia connata S. F. Gray, Nat. Arr. Brit. Pl. **1**: 644. 1821.
Polystictus perennis Karst. Rev. Myc. **3**: 18. 1881.
Pelloporus perennis Quél. Enchiridion, 166. 1886.

This species appears to be common throughout the northern hemisphere in temperate regions, occurring in woods on dry exposed soil, especially where fires have been kindled, or rarely in moss or leaves. When young, it is ferruginous-cinnamon in color with punctiform tubes and thin substance; as it grows older the pileus becomes more depressed, the tubes longer and more decurrent, the sterile marginal band disappears and the whole plant appears thicker and firmer; in age the color becomes hoary, the zones are more marked, much of the tomentum disappears and the tubes and margin become more or less fimbriate. These changes often appear very marked when collections made in autumn are placed beside those of midsummer.

The present species is at once distinguished from *C. parvula* by its much smaller tubes and from *C. cinnamomea* by its larger size, more deeply depressed center and less shining surface. Specimens have been examined for the principal herbaria and published

exsiccati, among which the following will indicate the distribution of the species: Finland, *Karsten;* Sweden, *Starbäck;* Saxony, *Krieger;* Hungary, *Linhart;* Belgium, *Westendorp & Wallays;* France, *Fautrey;* England, *Massee, Plowright;* Canada, *Macoun;* Maine, *Blake, Harvey, Ricker, Macdougal;* Massachusetts, *Fursten;* Washington, *Macbride;* Wisconsin, *Calkins;* Michigan, *Minns;* Minnesota, *Holway;* New York, *Shear, Peck;* New Jersey, *Ellis.*

3. **Coltricia parvula** (Kl.)

Polyporus parvulus Kl. Linnaea, **8**: 483. 1833.
Polyporus connatus Schw. Trans. Am. Phil. Soc. **4**: 154. 1834.
Polystictus parvulus Fr. Nov. Symb. 70. 1851.
Polyporus focicola B. & C. Jour. Linn. Soc. Bot. **10**: 305. 1868.

This species was described from plants in the Hooker herbarium collected by Dr. Richardson in America. Klotsch had hardly published his description before Schweinitz described the same plant under the name *Polyporus connatus.* When Fries established the genus *Polystictus,* this species was listed first, thus becoming its nomenclatorial type. Later it was renamed *P. focicola* by Berkeley and Curtis, the reason not being assigned. The plant occurs only in North America and is confined, so far as is known, to the states south of Massachusetts. As with *C. perennis,* it usually grows on earth mixed with ashes and charcoal from fires built in woods.

There is no difficulty in distinguishing it from *C. perennis* except in middle ground occupied by both species, where they have a tendency to approach each other in varieties. There can be no doubt that the two species are intimately related in origin and the inference is that *C. parvula* is an offspring of the cosmopolitan species induced by conditions existing at one time in the more southern parts of North America. They are at present, however, so distinct that a plant collected in Georgia may with little hesitation be called *C. parvula,* while one from Canada may with equal certainty be labeled *C. perennis.* The following collections of *C. parvula* are at hand: North Carolina, *Curtis;* South Carolina, *Ravenel;* Georgia, *Harper;* Alabama, *Earle;* Delaware, *Commons;* Pennsylvania, *Everhart, Jeffries & Haines.* In every instance the collection was made on soil where fires had been built.

4. **Coltricia tomentosa** (Fr.)

Polyporus tomentosus Fr. Syst. Myc. **1**: 351. 1821.
Polyporus dualis Peck, Rept. N. Y. State Mus. Nat. Hist. **30**: 44. 1878.
Pelloporus tomentosus Quél. Enchiridion, 166. 1886.
Macronoporus tomentosus Ell. & Ever. Journ. Myc. **5**: 28. 1889.
Onnia tomentosa Karst. Finlands Basidv. 326. 1889.
Xanthochrous tomentosus Pat. Cat. Tun. 52. 1897.

This species has frequently been collected by North American mycologists, but has rarely been correctly determined by them. Some European botanists are no less confused by the two Friesian species, *P. tomentosus*, described in 1821 and *P. circinatus*, described in 1848. At Upsala there is no type specimen of the latter species, while types of *P. tomentosus* correspond in all respects with our common species, the hymenium bearing the same kind of spines and the context being dual instead of homogeneous. Indeed, I have seen nothing in any foreign herbarium to indicate that *P. circinatus* is specifically distinct from *P. tomentosus*.

This fungus usually grows on or near the ground beneath pines, spruces and other coniferous trees. Collections are at hand from Bavaria, *Allescher;* Sweden, *Romell;* Canada, *Macoun;* Maine, *Curtis;* New Hampshire, *Minns;* Vermont, *Burt;* Massachusetts, *Clarke;* Pennsylvania, *Stevenson;* New York, *Peck;* New Jersey, *Ellis;* West Virginia, *Nuttall;* Colorado, *Underwood & Selby*.

5. **Coltricia obesa** (Ell. & Ever.)

Polystictus obesus Ell. & Ever. Bull. Torrey Club, **24**: 125. 1897.

This species was collected at Newfield, New Jersey, and at Philadelphia, Pennsylvania, growing on buried pine branches. It is thick and spongy in texture, depressed, rusty cinnamon, azonate, with dark cinnamon stipe, which is central and usually much enlarged below. The spores are elliptical, ferruginous, 7–8 × 4–5 μ. No spines are present. The plant resembles *Coltricia perennis* in color, but is larger, thicker, more fragile and entirely free from zones. From *C. tomentosa*, it differs in being darker in color, homogeneous in texture and free from cystidia. Type specimens are now in the herbarium of the New York Botanical Garden.

6. **Coltricia Memmingeri** sp. nov.

A large dark brown plant with rough shaggy surface and short thick stipe much dilated at the base. Pileus very irregular, circular to dimidiate, convex to plane or depressed, 10 × 1 cm.; surface fulvous to dark seal brown, ornamented with long imbricated scales of the same color, margin alutaceous, pubescent, sterile, subacute, undulate: cortex corky, fragile, azonate, 0.5–1 cm. thick, thinner towards the margin, concolorous; tubes adnate, 1–4 mm. long, 1–3 to a mm., umbrinous, apparently blackening with age, mouths circular and whitish when young, becoming angular, irregular and concolorous or darker with age, dissepiments entire to dentate: spores ovoid, smooth, light ferruginous, usually 2-guttulate, 4 × 7 μ; hyphae golden-yellow; cystidia none; stipe central or excentric, at times confluent, very short, thick, angular or flattened, dilated at the base to twice its thickness above, resembling the pileus in color, surface and substance, 1–3 × 3–5 cm.

The above description was made from specimens collected at Blowing Rock, North Carolina, by Mr. E. R. Memminger, September 1, 1901, and sent to the Underwood herbarium. According to the accompanying field notes, it is a rare species and one of peculiar habits, being found on steep clay banks with its short stipe broadly spreading at the base, reminding one of a sea-anemone, and its pileus irregular and deformed by the steepness of its habitat and soaked with moisture from the wet clay soil and the surface water that trickles past it. In some ways it suggests forms of *P. Schweinitzii*, but differs widely in the color of its tubes and spores as well as in its shaggy surface and peculiar stipe. In many ways it forms a climax to the series which begins with *C. cinnamomea* and ends with *C. obesa*, the plants increasing in size, thickness, irregularity, variability and roughness as one proceeds.

I take pleasure in dedicating the species to its discoverer, Mr. Memminger. The type plants are now in the herbarium of the New York Botanical Garden.

SPECIES INQUIRENDÆ

Polyporus simillimus Peck, Rept. N. Y. State Mus. Nat. Hist. **32**: 34. 1879. This species was based on plants collected at Brewerton, New York, on burnt soil where *C. parvula* grew. It is said to closely resemble *C. parvula* when looked at from above, but

to have much smaller tubes and slightly longer spores, which are tinged with red at times. It is also very close to old plants of *C. perennis* collected in autumn. Additional collections should decide whether it is a good species or only a variety, as it was first considered by Peck.

Coltriciella gen. nov.

Hymenophore small, annual, tough, epixylous; stipe attached to the vertex of the pileus; surface of the pileus anoderm, zonate; context spongy, fibrous, ferruginous, tubes angular, one-layered, dissepiments thin; spores ellipsoidal, smooth, ferruginous.

The type of this genus is *Polyporus dependens* B. & C., a very rare plant found thus far only on dead pine logs in South Carolina and New Jersey. In some ways it resembles the genus *Porodiscus*, the species of both being small and epixylous with vertically attached stipes, but the two genera are very distinct as regards more important characters, such as the structure of the context and spores. From *Coltricia*, its nearest ally, the present genus differs chiefly in being uniformily epixylous and in having a pendant vertically-attached pileus. The name I have chosen refers to its general resemblance to *Coltricia*, this resemblance being best seen in *Coltricia cinnamomea*, which grows very frequently on wood in a state of advanced decay. Only one species is known.

Coltriciella dependens (B. & C.)

Polyporus dependens B. & C. Ann. Nat. Hist. II. **12**: no. 44. 1853.
Grevillea, **1**: 37. 1872.
Polystictus dependens Sacc. Sylloge Fung. **6**: 213. 1888.

This very rare and interesting little fungus was first collected by Curtis in South Carolina on decorticated pine wood lying on the ground. It has since been found at Newfield, New Jersey, once under a decaying oak log and twice on a dead pine. The first of these collections on pine seems to have been quite abundant, since there are still in the Ellis collection about twenty-five specimens of it. Ellis says that they grew from the upper surface of the hollow in a rotten log, where they were found on July 30, 1883. On April 21, 1890, Dr. F. W. Anderson discovered a few plants growing on a rotten pine knot near Newfield. I am inclined to think that the collection made under the dead oak log was really growing on chips or sticks of pine.

The nomenclature of the royal palms

O. F. Cook

In two previous discussions of botanical nomenclature * the royal palms and their relatives have served as instances of the prevailing taxonomic confusion. The West Indian species which in general practice for many years past have constituted the genus *Oreodoxa* are, in all probability, generically distinct from either of the two Venezuelan species placed under *Oreodoxa* when that genus was first described by Willdenow in 1804.† Detailed reasons for this view were included in a "Synopsis of the palms of Porto Rico," ‡ where a new royal palm found in that island was described under the name *Roystonea borinquena*. In a recent fascicle of the *Symbolae Antillanae*,§ the important work on West Indian botany now being issued by Professor Urban of Berlin, the royal palm of Porto Rico is admitted to be distinct from that of Cuba, but is given the name *Oreodoxa caribaea*.

Unsystematic methods of systematic study have resulted in endless nomenclatorial complications which should not be discussed, perhaps, outside technical monographs. The royal palms, however, are among the most conspicuous members of the vegetable world, and the errors which have been made in dealing with them are not without practical interest as samples of the confusion which could be avoided by adherence to the more simple and practical system of nomenclatorial procedure sometimes termed the "method of types."

Like many of his contemporaries, Martius, the great German palm specialist of the first half of the last century, largely disregarded the work of his predecessors, in the sense that he "emended" generic descriptions with the greatest freedom and did not hesitate to apply generic names to groups of species not

* The method of types in botanical nomenclature. Science, II. **12**: 475. 1900. Types and synonyms. Science, II. **15**: 648. 1902.

† Mem. Acad. Roy. Berlin, **1804**: 37. 1807.

‡ Bull. Torrey Club, **28**: 552. 1901.

§ Dammer, U., and Urban, I. *Palmae*. Symbolae Antillanae, **4**: 126. 1903.

related to those for which they were originally proposed. Martius seems to have had no personal acquaintance with either of Willdenow's two original species of *Oreodoxa* from Venezuela. The first he left nominally in the genus and the second he referred to *Iriartea*, but the centre of gravity, as it were, was shifted to the West Indian species unknown to Willdenow. Wendland, whose knowledge of the palms of the Caribbean region advanced far beyond that of Martius, did not show any corresponding improvement of nomenclatorial policy. He completed the removal of both the original species from *Oreodoxa*, assigning the first (*O. acuminata*) to *Euterpe*, and the second (*O. praemorsa*) to a new genus *Catoblastus*, leaving the West Indian royal palms in full possession of the name *Oreodoxa*, though with no defensible title. There seems to be no reason for setting aside Wendland's opinion that *O. acuminata* is a *Euterpe* rather than an *Oreodoxa*, in the Martian sense, but the name *Euterpe* is not available for any American palm,* and a new name would be required for the group to which *O. acuminata* belongs unless *Oreodoxa* be restored to its original place in the system.

Messrs. Dammer and Urban rejected Wendland's idea of the affinities of *Oreodoxa acuminata* and consider it congeneric with the West Indian royal palms because seedlings supposed to belong to *O. acuminata* † have the primary leaves of the germinating plant simple and entire, while those which follow have the apex bifid and long-produced. It is not explained why similarities of the seedlings should be supposed to cancel differences of the adult palm, and such an argument would prove too much in the present case, because *Acrista*, and probably several other genera, related and unrelated, have primary leaves of the character described.

Generic diagnoses of palms have commonly taken into account only floral characters. Perhaps the use of the seedlings may lead in time to an appreciation of other vegetative features. The cespitose, "stoloniferous" habit of *Oreodoxa acuminata*, for example, furnishes as important evidence of relationship as the seedling, and this supports the association of the type of *Oreodoxa*

* See page 351.

† No indication of the origin of these seedlings is given, nor of the manner in which they were specifically identified as belonging to *Oreodoxa acuminata*.

with the many other slender cespitose "stoloniferous" "*Euterpe*" palms of the South American continent, rather than with any of the insular types. This indication of alliance is strengthened, moreover, by the remainder of Willdenow's description, especially the tripartite style and globose longitudinally sulcate seed. The gamosepalous calyx, and the large woody spathe, are also characters of the related continental genus *Oenocarpus*. Kunth described in 1815 additional species of *Oreodoxa* from Colombia (*O. Sancona* and *O. frigida*) with a tubular three-lobed calyx and three styles, so that these characters of *Oreodoxa* can scarcely be ignored as errors on the part of Willdenow.

The genus *Roystonea*, to which the West Indian royal palms belong, is unique in the possession of a spherical or ovoid rudimentary pistil in the staminate flowers, while all the other related genera retain the more primitive character of a conical or columnar pistillode three-lobed at the apex. According to Willdenow and Kunth the true *Oreodoxa* of the mountains of South America is peculiar in having the flowers bisexual, which would represent a still more backward stage of development. If these authorities were in error they were deceived, evidently, by large three-styled pistillodes of the staminate flowers which would, however, be even more significant of the probability that the affinities of *Oreodoxa* do not lie with *Roystonea*, whatever be its relationships with *Oenocarpus* and other continental genera.

There are thus many indications favoring, and none opposing, the opinion of Wendland, that *Oreodoxa acuminata* is a "*Euterpe*," or, to speak with more nomenclatorial circumspection, that it is a genus of the considerable series of American palms to which the name *Euterpe* was applied by Martius, Wendland, and others. It would, in other words, have been more nearly correct to have applied the name *Oreodoxa* to the mountain palm of Porto Rico (*Acrista*) than to have made it supplant *Roystonea*, *Acrista* being obviously nearer to the cespitose continental species of "*Euterpe*" than are the robust and otherwise rather specialized royal palms.

The use of the name *Euterpe* in the above discussion is an apparently necessary concession to history, though an unfortunate one, since it has been shown elsewhere that *Euterpe* has no true place in American botany, having been proposed originally for an

unrelated East Indian palm.* In *Die natürlichen Pflanzenfamilien*, Professor Drude recognizes six genera of American palms of the group in which *Euterpe* and *Oreodoxa* are placed, though he distributes them among three separate series of Old World genera, from the Malay region and the islands of the Pacific and Indian Oceans. They seem, however, to constitute a compact natural group, as coherent in their characters as they are in their geographical distribution, and worthy of taxonomic recognition as a distinct tribe.

The genera of the tribe *Acristeae* may be separated by the following diagnostic characters:

1. Staminate flowers with spherical or ovoid pistillodes and sessile stigmas; pistillate flowers with staminodes united into a six-toothed cup. Genus ROYSTONEA Cook; type, *R. regia* (H. B. K.) Cook, Cuba.
   Staminate flowers with conical or columnar pistillodes 3-parted at apex; stamens and staminodes free. 2.
2. Ripe fruit with stigma-scar basal. Genus HYOSPATHE, Martius; type, *H. elegans* Martius, Brazil.
   Ripe fruit with stigma-scar lateral or apical. 3.
3. Leaves pinnately divided below, entire above, ending in a large simple bifurcate blade. Genus PRESTOEA Hook. f.; type, *P. pubigera* (Griseb. & Wendl.) Hook. f., Trinidad.
   Leaves divided throughout into equal or graded narrow pinnae. 4.
4. Stamens 9–20; inflorescence interfoliar. Genus JESSENIA, Karsten; type, *J. polycarpa* Karsten, Brazil.
   Stamens 6; inflorescence distinctly infrafoliar. 5.
5. Internodes short, leaf-bases not long-sheathing. Genus OENOCARPUS Martius; type, *O. distichus* Martius, Brazil.
   Internodes long, leaves with long sheathing bases. 6.
6. Calyx of staminate (or bisexual?) flowers with sepals united at base. Genus OREODOXA Willd.; type, *O. acuminata* Willd., Venezuela.
   Calyx with three distinct broadly imbricate sepals. 7.
7. Trunk attenuate, increasing in thickness with age; spathes ensiform, flat; branches of spadix subtended by large spathe-like bracts; seeds with uniform albumen. Genus PLECTIS;† type, *P. Oweniana* sp. nov., Guatemala.

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* Bull. Torrey Club, **28**: 556. 1901.

† **Plectis** gen. nov.

Trunk solitary, very tall, slender and tapering, the diameter increasing with age. Leaves long-sheathing at base; petiole short; pinnae very numerous, narrowly linear, horizontal or drooping.

Spathes numerous, coriaceous, but thin and flexible; outer spathes short; two long ensiform complete spathes; a large lanceolate-ligulate incomplete spathe subtending the lowest branch of the spadix; a small ligulate spathe or bract subtends each of the other branches.

Trunk columnar; spathes fusiform or subcylindric; branches of spadix with bracts rudimentary or wanting; seed deeply ruminate. 8.

8. Stigma of ripe fruit lateral; embryo basal; solitary, not stoloniferous. Genus ACRISTA Cook; type, *A. monticola* Cook, Porto Rico.

Stigma of ripe fruit subapical; embryo lateral; stoloniferous, cespitose. Genus CATIS Cook; type, *C. Martiana* Cook (*Euterpe oleracea* Martius), Brazil.

A similar history of nomenclatorial lawlessness is concealed behind the exclamation point of certainty with which Messrs. Dammer and Urban associate the specific name *caribaea* and the royal palm of Porto Rico. Jacquin described from the Carib Islands in 1763 an *Areca oleracea*, which Martius assigned to the genus *Euterpe*, but he disregarded the priority of Jacquin's specific name *oleracea* and made a new *Euterpe oleracea* of his own from Brazil. When Sprengel undertook the revision of Linnaeus' *Systema Vegetabilium*, published in 1825, he found both these *oleracea* species claiming entry under *Euterpe*, and renamed Jacquin's plant *Euterpe caribaea*. Martius himself placed *Euterpe caribaea* Sprengel as a synonym under *Oreodoxa oleracea* in the third volume of his *Historia Naturalis Palmarum* (page 166), after he had come to look upon the royal palms as generically distinct from *Euterpe*.

It seems certain, moreover, that Sprengel and Martius were dealing with a single palm. How Messrs. Dammer and Urban have brought the two species into the *oleracea-caribaea* complication appears utterly mysterious, unless it be that they have disre-

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Fruits small, subglobose, with a very prominent subapical stigmatic scar; pericarp thin, firmly fleshy; a layer of coalesced fibres adhering to the smooth seed; albumen uniform; embryo basal.

Plectis Oweniana sp. nov.

Trunk smooth, ringed with leaf-scars, 25 meters and upwards; diameter at base 25–30 cm.; at apex 10 cm. or less; supported on a conical mass of thick roots with large fibrous root-caps.

Leaf-sheaths over 150 cm. long; petiole 37–47 cm. long by 2.7 wide at apex; rachis 267 cm. tapering more or less and produced into a slender fiber as long as the terminal pinnae; total length of leaf 481 cm., basal pinnae 67 cm. by 1.1 cm., middle pinnae 81–93 cm. by 3.5 cm., terminal pinnae 37 cm. by 1.2 cm. or less, generally split with age into narrow grass-like shreds 5 mm. or less in width. Upper surface of rachis flat at base but gradually narrowed upward, the cross-section becoming subtriangular.

Habitat: steep slopes and summits of mountains in the vicinity of Senahu, Alta Vera Paz, Guatemala, at an elevation of 600–900 meters. It is said not to occur in the Coban district further west.

Native name in the Kekchi language "*halaute*"; also called "*ternera*" by the ladino population of Alta Vera Paz.

garded the above history and relied entirely upon the finding in Sprengel's herbarium of a specimen of the Porto Rican royal palm erroneously identified as *Euterpe caribaea*.* They do not, however, give any reason for believing that Sprengel had this specimen in hand or in mind while revising the *Systema*, and there are several points of internal evidence which forbid such a supposition. The name *caribaea* was not proposed for a new species; the name for which it was substituted being given at the end of the description "(*Areca oleracea* Jacq.)." There is no mention of Porto Rico, the only locality given being that of Jacquin, "*Ins. Carib.*" a term which seems not to have included Porto Rico, Jamaica and the other larger Antilles, which were frequently mentioned by name. Sprengel shows care and discrimination in the indication of localities, and wrote "*Ind. occ.*" and "*Ins. Antill. minor*" when plants were known from different islands of the West Indies. Finally the description of *Euterpe caribaea* definitely excludes the royal palm of Porto Rico by stating that the fruit is somewhat curved, "*fructibus oblongis subincurvis*," a peculiarity mentioned by Jacquin in the same words, and known to exist only in the royal palm of the southern islands of the lesser Antilles.†

With these facts in view it seems apparent that the discovery of Sprengel's mislabeled specimen does not bring his *Euterpe caribaea* any nearer to Porto Rico than before, nor does it alter three-quarters of a century of botanical history in which this name has remained in oblivion as a synonym of *Oreodoxa oleracea*, a period of disuse which under a consistent application of the Berlin fifty year rule would have rendered its resuscitation impossible, whatever its original merits.

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* The Caribbean royal palm, *Roystonea oleracea*, formerly called *Oreodoxa oleracea*, has been reported from Porto Rico more than once, but its occurrence is not authenticated. The Porto Rican specimens distributed from Berlin as *Oreodoxa oleracea* (Sintenis *no. 1525*), stated to have been identified by Professor Drude, do not belong to this genus, but represent *Acrista monticola*.

† Some botanists may hold that Sprengel should be followed in changing the name of Jacquin's *oleracea*, on the ground that the Brazilian *oleracea* of Martius had priority as a species of *Euterpe*, but if the name *caribaea* is to be taken away from Jacquin's *oleracea* of the Carib Islands and used for the royal palm of Porto Rico (to supplant *borinquena*), it is evident that the older and more southern species would still be in need of a name, so that even the motive of economy is lacking as a justification for the arbitrary change proposed at Berlin.

The few readers, if any, who may have had the curiosity to follow along this barren path of unnecessary error may be the better able at least, to understand why systematic study has come to be looked upon, more and more, as an unproductive part of the biological field. The history of the nomenclatorial vicissitudes of the royal palm is no unique instance, and is not brought forward as an indication of any special carelessness or perversity on the part of Professor Urban or Dr. Dammer. It is a fair and typical example of the taxonomic methods, or lack of methods, which still render much of the systematic work of even the larger botanical centers a waste of the time, not merely of the specialists now writing, but also of their successors who must some time unravel the skeins so industriously tangled. The method of types, requiring the fixed and definite application of names, is as essential for taxonomy as the multiplication table for mathematics, dates for history, or latitude and longitude for geography. It is so axiomatic, indeed, that it escaped formulation by DeCandolle and other eminent taxonomists, and is evidently still unconsidered by European botanists. The recent announcement of a botanical congress, to be held in Vienna in 1905, provides that all proposals of nomenclatorial reform must be based on DeCandolle's Paris Code of 1867. The method of types is more fundamental however, than anything in the Paris Code, and once admitted to the serious consideration of taxonomic workers is soon found to justify a thorough recasting of nomenclatorial legislation. This task is already well advanced in America, though not yet entered upon by our trans-Atlantic colleagues.

The present vast confusion of names and methods has tended, no doubt, to discourage the entrance into systematic biology of those who appreciate that life is short, and that names and classifications are not the final objects of scientific study. Nevertheless, the fact that nine tenths of the difficulties of formal nomenclature can be permanently removed by consistent adherence to a few simple rules will have its effect in time, and biological taxonomy may ultimately serve its original purpose of rendering nature and science more accessible, instead of artificially multiplying labor and confusion.

Notes on Colorado plants

GEORGE E. OSTERHOUT

OREOBROMA TRIPHYLLA (Wats.) Howell

Claytonia triphylla Wats.

This peculiar little plant was collected near timber-line in the mountains east of Steamboat Springs, Routt Co., Colorado, July 15, 1902. In flower it has the appearance of a small *Claytonia*, and the thread-like stem beneath the soil is from a corm similar to the species of that genus. It has been reported only from the mountains much farther west.

OREOBROMA NEVADENSIS (Gray) Howell

Calandrinia nevadensis Gray.

Collected in the valley of the Bear river at Steamboat Springs, Routt Co., Colorado, June 18, 1903. It seems not to have been reported from Colorado or adjacent territory.

CYMOPTERUS PARRYI (C. & R.) Jones.

Mature fruiting specimens of this species were collected at McCoys, Eagle Co., Colorado, June 14, 1903. At first sight it does not differ much from *Cymopterus acaulis* (Pursh) Rydb. but the fruit is considerably larger. I think its collection has been reported only a few times and never before from Colorado.

AGOSERIS AGRESTIS Osterhout, Bull. Torrey Club, **28**: 645.

Further field-study has convinced me that this is not a valid species, but a robust form of the variable *Agoseris glauca* (Pursh) Greene. Separated from the intermediate forms it appears to be a good species but really grades into the older species.

Arabis rugocarpa sp. nov.

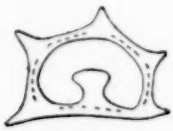
A perennial many-stemmed from the root, the stems attaining a length of 1 to 1.5 cm., pubescent below and leafy to the inflorescence, the leaves small and auriculate, but the auricles small; the radical leaves oblanceolate, acuminate, 2 to 3 cm. long including the narrowly winged petiole, pubescent with forked hairs,

but not thickly so, and the margins ciliate; the flowers light purple, the calyx-lobes spatulate, scarious-margined, 2 mm. long, and the corolla-lobes 5 mm. long; the pods rugose, about 3 cm. long, reflexed, on pedicels 5 mm. long, the valves one-nerved; the seeds in a single row, nearly round, slightly margined, a little more than 1 mm. in diameter; cotyledons accumbent.

Collected at Malta, a station on the Denver & Rio Grande Railway near Leadville, Colorado, June 20, 1903, *no. 2800*. Collected also at the same place in 1900.

Aulospermum angustum sp. nov.

Perennial from a deep-seated fleshy root; stem naked, crowned with a cluster of leaves and the peduncles, the whole 2 or more dm. in height; leaves narrowly ovate in outline, on short petioles, 0.5 to 0.75 dm. long, bipinnatifid, the segments small and the whole leaf glaucous; the fruiting peduncles much longer than the leaves, 1 to 2 dm. long; the umbel 5 or more rayed; involucre none; involucels of few subulate bractlets; rays about 1 cm. long, pedicels 3 to 4 mm. long; the fruit 6 to 7 mm. long, the 5 carpel-wings narrow and subequal; the oil-tubes 4 to 5 in the intervals (mostly 5) and 6 on the commissure; flowers yellow.



Collected in the valley of the Bear river between Steamboat Springs and Hayden, Routt Co., Colorado, June 17, 1903, *no. 2783*.

Senecio Fendleri lanatus var. nov.

Several-stemmed from the root, usually branched, very leafy to the inflorescence; leaves linear, pectinate pinnatifid, the divisions crenate-toothed, upper leaves reduced and becoming bract-like; the whole plant very lanate to the inflorescence; peduncles short, heads numerous and crowded, almost 1 cm. long, the bracts very nearly glabrous; *rays none*.

Collected along the sides of a dry gulch at Wolcott, Eagle Co., Colorado, July 11, 1902, *no. 2667*.

NEW WINDSOR, COLORADO.

INDEX TO AMERICAN BOTANICAL LITERATURE

(1904)

The aim of this Index is to include all current botanical literature written by Americans, published in America, or based upon American material; the word America being used in its broadest sense.

Reviews, and papers which relate exclusively to forestry, agriculture, horticulture, manufactured products of vegetable origin, or laboratory methods are not included, and no attempt is made to index the literature of bacteriology. An occasional exception is made in favor of some paper appearing in an American periodical which is devoted wholly to botany. Reprints are not mentioned unless they differ from the original in some important particular. If users of the Index will call the attention of the editor to errors or omission their kindness will be appreciated.

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Aikin, W. H. Check list of Hamilton County, Ohio, plants, exclusive of the lower cryptogams. Jour. Cincinnati Soc. Nat. Hist. **20**: 199–230. 5 My 1904.

Aikin, W. H. List of medicinal plants, wild or cultivated, growing in the vicinity of Cincinnati, Ohio, with notes as to the parts used for medicinal purposes. Jour. Cincinnati Soc. Nat. Hist. **20**: 231–234. 5 My 1904.

Ames, O. Additions to the orchid flora of Florida. Proc. Biol. Soc. Wash. **17**: 115–117. 19 My 1904.

Anderson, J. B. The blue gum: a brief study of *Eucalyptus globulus* and others of the same genus in California. Forestry & Irrig. **10**: 65–70. F 1904. [Illust.]

Anderson, M. P. The protection of our native plants. Jour. N. Y. Bot. Gard. **5**: 71–79. Ap 1904.

Andrews, A. L. Bryophytes of the Mt. Greylock region, — III. Rhodora, **6**: 72–75. 6 Ap 1904.

Bailey, W. W. The *Eucalyptus*. Am. Bot. **5**: 91–93. [Ja 1904.]

Bailey, W. W. An odd distribution of common plants. Am. Bot. **6**: 41–43. [My] 1904.

Bailey, W. W. Willows; "pussey" and others. Am. Bot. **6**: 23, 24. [Ap] 1904.

Batchelder, F. W. A point of honor. Nature Study (N. H.), **4**: 181–185. *pl.* Mr 1904.
Discusses the occurrence of the swamp white cedar at Manchester, N. H.

Beal, W. J. The future of white pine and Norway pine in Michigan. Rep. Mich. Acad. Sci. **4**: 106, 107. 1904.

Beal, W. J. Some of the changes now taking place in a forest of oak openings. Rep. Mich. Acad. Sci. **4**: 107, 108. 1904.

Bessey, C. E. A weedy fernwort. Fern Bull. **12**: 58. [My] 1904.
Notes occurrence of *Marsilea vestita* as a weed in Nebraska.

Bradshaw, M. F. Southern California solanums. Am. Bot. **6**: 21, 22. [Ap] 1904.

Brandegee, K. Notes on *Cacteae*. Zoe, **5**: 189–194. 18 Ap 1904.
Includes new species in *Cereus* (3) and *Mamillaria* (2).

Brandegee, T. S. A collection of Mexican plants. Zoe, **5**: 176–182. 18 Ap 1904.
Includes new species in *Thelypodium* (2), *Spermacoce*, *Gentiana*, *Gilia*, *Castilleia*, and *Krynitzkia*.

Brandegee, T. S. Palms of Baja California. Zoe, **5**: 187–189. 18 Ap 1904.
With a description of *Erythea Brandegeei* C. A. Purpus sp. nov.

Britton, N. L. George Washington's Palms. Jour. N. Y. Bot. Gard. **5**: 25–28. *pl. 20, 21.* F 1904.

Broadhurst J. The protection of our native plants. Jour. N. Y. Bot. Gard. **5**: 98–101. My 1904.

Brown, R. L. Wood structure of elms, maples and oaks as a means of identifying species. Rep. Mich. Acad. Sci. **4**: 109–112. 1904.

Burnham, E. J. "A freak of nature." Nature Study (N. H.), **4**: 201–203. *pl.* Ap 1904.
An abnormal cluster of pine cones.

Burnham, S. H. Ferns of Ann Arbor, Mich. Fern Bull. **12**: 50, 51. [My] 1904.

Cardot, J. & Thériot, I. The mosses of Alaska. Harriman Alaska Expedition, **5**: 251–328. *pl. 30–40.* 1904.
Reprinted from Proc. Wash. Acad. Sci. **4**: 293–372. *pl. 13–23.* 31 Jl 1902.

Cardot, J. & Thériot, I. New or unrecorded mosses of North America. II. Bot. Gaz. **37**: 363–382. *pl. 16–25.* 17 My 1904.
Includes descriptions of 24 new species in 15 genera.

Chase, A. The North American allies of *Scirpus lacustris*. Rhodora, **6**: 66–71. *pl. 52, 53.* 6 Ap 1904.
Includes a description of *S. heterochaetus* sp. nov.

Chodat, R. & Hassler, E. Plantae Hasslerianae, soit énumération des plantes récoltées au Paraguay. Bull. Herb. Boissier, II. **4**: 169–196. 31 Ja 1904; 257–292. 29 F 1904; 475–489. 30 Ap 1904.

Includes new species in *Coccocypselum*, *Sphinctanthus*, *Alibertia*, *Mapouria*, *Palicourea*, *Rudgea*, *Coussarea*, *Faramea*, *Borreria* (4), *Staëlia*, *Mitracarpus*, *Dipladenia*, *Andropogon*, *Paspalum* (2), *Panicum*, *Setaria*, *Aristida*, *Chloris*, *Pappophorum*, *Eragrostis*, *Hassleropsis* gen. nov., *Stemodia*, *Bacopa* (3), *Scoparia* (2), *Pithecolobium* (2), *Acacia* and *Mimosa*.

Christ, H. *Loxsomopsis costaricensis* nov. gen. et spec. Bull. Herb. Boissier, II. **4**: 393–400. *pl. 1.* 30 Ap 1904.

Clute, W. N. The measurement of variation in *Equisetum*. Fern Bull. **12**: 15–18. [Mr] 1904.

Clute, W. N. New or rare ferns from the southwest. Fern Bull. **12**: 43–45. [My] 1904.

Clute, W. N. A new species of *Equisetum*. Fern Bull. **12**: 20–23. [Mr] 1904.

E. Ferrissii sp. nov., from Illinois.

Clute, W. N. Raynal Dodge. Fern Bull. **12**: 51, 52. *portrait.* [My] 1904.

Clute, W. N. Sarah Frances Price. Fern. Bull. **12**: 25. *portrait.* [Mr] 1904.

Cockerell, T. D. A. Notes on *Tetraneuris linearifolia*. Proc. Biol. Soc. Wash. **17**: 111, 112. 18 My 1904.

Coker, W. C. Chapel Hill liverworts. Jour. Elisha Mitchell Sci. Soc. **20**: 35–37. 1904.

Copeland, E. B. New and interesting California fungi. Ann. Myc. **2**: 1–8. *pl. 1, 2.* 15 F 1904.

Includes new species in *Coprinus* (4), *Battarea* (2) and *Podaxon*.

Cummings, C. E. The lichens of Alaska. Harriman Alaska Expedition, **5**: 65–152. *pl. 8, 9.* 1904.

Includes descriptions of new species in *Verrucaria* and *Pertusaria*.

Curtiss, A. H. The fern flora of Florida. Fern Bull. **12**: 33–38. [My] 1904.

Daniels, F. P. Ecology of the flora of Sturgis, Mich., and vicinity. Rep. Mich. Acad. Sci. **4**: 145–159. 1904.

Daniels, F. P. The flora of the vicinity of Manistee, Mich. Rep. Mich. Acad. Sci. **4**: 125–144. 1904.

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Eaton, A. A. Dodge's fern. Am. Bot. **5**: 117. [F 1904.]

Eaton, A. A. The genus *Equisetum* in North America. Sixteenth paper. Fern Bull. **12**: 23–25. [Mr] 1904; Seventeenth paper. Fern Bull. **12**: 39–43. [My] 1904.

Eaton, A. A. A preliminary list of *Pteridophyta* collected in Dead County, Florida, during November and December, 1903. Fern Bull. **12**: 45–48. [My] 1904.

Evans, A. W. Hepaticae of Alaska. Harriman Alaska Expedition, **5**: 339–372. *pl. 41–43.* 1904.
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Fedde, F. Was ist *Platystemon leicocarpum* Fisch. et Meyer? Ber. Deuts. Bot. Gesells. **22**: 92–95. *f. 1, 2.* 24 Mr 1904.
Identifies *P. emarginatus* Greene as the original *P. leiocarpus* F. & M., and gives the new name *P. Greeneanus* to the plant called *P. leiocarpus* by Greene.

Fetherolf, J. M. *Asplenium ebenoides.* Fern Bull. **12**: 26. [Mr] 1904.

Foster, A. S. Hercules' club. [*Echinopanax.*] Am. Bot. **6**: 6–8. [Mr] 1904.

Foster, A. S. Shittimwood. [*Rhamnus Purshianus.*] Am. Bot. **6**: 47, 48. [My] 1904.

Gagnepain, F. Zingibéracées et Marantacées nouvelles de l'Herbier du Muséum (11e note). Bull. Soc. Bot. France, **50**: 586–590. Ja 1904.
Includes new species of *Costus* and *Calathea* (2), described from cultivated plants, probably of American origin.

Giesenhagen, K. *Sorica Dusenii* n. gen. und n. sp., ein im Farnsorus lebender Askomycet. Ber. Deuts. Bot. Gesells. **22**: 191–196. *pl. 13.* 27 Ap 1904.
On *Polypodium crassifolium* from Brazil.

Gleason, H. A. The dwarf white trillium. Am. Bot. **6**: 43–45. [My] 1904.

Graves, F. M. *Helenium nudiflorum* in Groton, Connecticut. Rhodora, **6**: 79, 80. 6 Ap 1904.

Greene, E. L. Some Canadian antennarias. — II. Ottawa Nat. **18**: 37–39. 6 My 1904.
Descriptions of 5 new species of *Antennaria.*

Greenman, J. M. New species of Mexican plants. Zoe, **5**: 183–187. 18 Ap 1904.
New species in *Cerastium* (3), *Arenaria*, *Dalea*, *Nama* and *Eupatorium* (2).

Guérin, P. Recherches sur le développement et la structure anatomique du tégument seminal des Gentianacées. Jour. de Bot. **18**: 33–36. Ja 1904; 37–52. *f. 1–20.* F 1904; 83–88. *f. 21–25.* Mr 1904.

Guillet, C. Relationship between the weather and plant growth: a comparative study of the last two springs. Ottawa Nat. **18**: 40–54. 6 My 1904.

Harger, E. B. Some introduced plants of Connecticut. Rhodora **6**: 78. 6 Ap 1904.

Hariot, P. & Patouillard, N. Description de Champignons nouveaux de l'Herbier du Muséum. Bull. Soc. Myc. France, **20**: 61–65. 30 Ap 1904.

Includes two new American species: *Calvatia Digueti*, from California, and *Zignoella cubensis*, from Cuba.

Harris, J. A. A new theory of the origin of species. The Open Court, **18**: 192–202. Ap 1904.

With a *portrait* of H. de Vries, of whose mutation-theory it treats.

Hemsley, W. B. *Chloraea crispa*. Curt. Bot. Mag. III. **60**: *pl. 7955*. 1 My 1904.

Native of Chile.

Hemsley, W. B. *Dicentra chrysantha*. Curt. Bot. Mag. III. **60**: *pl. 7954*. 1 My 1904.

Native of California.

Hemsley, W. B. *Marsdenia Imthurnii*. Curt. Bot. Mag. III. **60**: *pl. 7953*. 1 My 1904.

A new species; native of British Guiana.

Hennings, P. Fungi fluminenses a cl. E. Ule collecti. Hedwigia, **43**: 78–95. 24 Mr 1904.

Includes two new genera, *Perisporiopsis* and *Balansiella*, and 41 new species in 33 genera.

Hennings, P. Ueber die auf *Hevea*-arten bisher beobachteten parasitischen Pilze. Notizbl. Königl. Bot. Gart. Berlin, **4**: 133–138. *pl.* 15 Ap 1904.

Includes new species in *Dothidella*, *Aposphaeria* and *Ophiobolus*.

Hieronymus, G. *Selaginellarum* species novae vel non satis cognitae. II. *Selaginellae* e subgenere (vel sectione) *Heterophyllo*. Continuatio prima. Hedwigia, **43**: 1–64. 29 F 1904; 65. 24 Mr 1904.

Includes many Mexican, Central American and South American species, of which 13 are described as new.

Hill, E. J. Remarks on some fernworts of western New York. Fern Bull. **12**: 18–20. [Mr] 1904.

Kalbfleisch, A. S. *Polystichum acrostichoides* and some insects that infest it. Fern Bull. **12**: 48–50. [My] 1904.

Kaufman, P. Gleanings from sea and mountain. Am. Bot. **5**: 85–88. [Ja 1904.]

Notes on the flora of Avon, N. J., and of Griffin's Corners, N. Y. (Catskill Mountains.)

Klugh, A. B. The orchids of Wellington County, Ontario. Am. Bot. **5**: 105–109. [F 1904.]

Klugh, A. B. Treasure trove. Fern Bull. **12**: 26. [Mr] 1904.

A note on the ferns of Wellington Co., Ontario.

Knight, O. W. *Cleome serrulata* in Maine. Rhodora, **6**: 79. 6 Ap 1904.

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Lindau, G. *Acanthaceae* americanae III. Bull. Herb. Boissier, II. **4**: 313–328. 31 Mr 1904; 401–418. 30 Ap 1904.

Descriptions of 45 new species in 16 genera, of which 5 are new: *Steirosanchezia*, *Encephalosphaera*, *Chalarothyrsus*, *Trybliocalyx* and *Juruasia*.

Lister, A. & G. Notes on *Mycetozoa*. Jour. Bot. **42**: 129–140. *pl. 459.* 1 My 1904.

Contains various references to American material.

Livingston, B. E. Physical properties of bog water. Bot. Gaz. **37**: 383–385. 17 My 1904.

Longyear, B. O. A preliminary list of the saprophytic fleshy fungi known to occur in Michigan. Rep. Mich. Acad. Sci. **4**: 113–124. 1904.

MacDougal, D. T. Botanical explorations in the southwest. Jour. N. Y. Bot. Gard. **5**: 89–98. *pl. 23 + f. 13–17.* My 1904.

Magnus, P. Ein weiterer Beitrag zur Kenntniss der Gattung *Uredinopsis*. Hedwigia, **43**: 119–125. *pl. 1, 2.* 24 Mr 1904.

Deals wholly with American material, describing two new species from Cayuga Lake, N. Y.

Maublanc, A. Espèces nouvelles de Champignons inférieurs. Bull. Soc. Myc. France, **20**: 70–73. 30 Ap 1904.

Includes new Mexican species and varieties in *Vizella*, *Phyllachora*, *Coniothyrium* and *Aecidium*.

Milesi, M. & Traverso, G. B. Saggio di una monografia del genre *Triphragmium*. Ann. Myc. **2**: 143–156. *pl. 5.* 15 Ap 1904.

Of the nine species recognized, three occur in America.

Nelson, A. New plants from Wyoming, XV. Bull. Torrey Club, **31**: 239–247. 18 My 1904.

Includes new species in *Eriogonum* (2), *Linum*, *Anogra*, *Pachylophus*, *Lavauxia*, *Gentiana*, *Hedeoma*, *Castilleja* and *Symphoricarpos*; and *Chondrophylla*, a new genus of *Gentianaceae*.

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Opperman, M. A contribution to the life history of *Aster*. Bot. Gaz. **37**: 353–362. *pl. 14, 15*. 17 My 1904.

Osmun, A. V. Further stations for *Botrychium matricariaefolium* in Connecticut. Rhodora, **6**: 80. 6 Ap 1904.

Parish, S. B. The fern flora of California. Fern Bull. **12**: 1–15. [Mr] 1904.

Ramaley, F. Anatomy of cotyledons. Bot. Gaz. **37**: 388, 389. 17 My 1904.

Rehm, H. *Ascomycetes* Americae borealis. Ann. Myc. **2**: 32–37. 15 F 1904; 175–178. 15 Ap 1904.
Includes 19 new species in 17 genera.

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Robinson, B. L. Diagnoses and synonymy of some Mexican and Central American eupatoriums. Proc. Boston Soc. Nat. Hist. **31**: 247–254. 20 F 1904.
With descriptions of nine new species of *Eupatorium*.

Robinson, B. L. New spermatophytes of Mexico and Central America. Proc. Boston Soc. Nat. Hist. **31**: 265–271. 20 F 1904.
Including new species in *Hechtia*, *Cerastium*, *Parnassia*, *Pentstemon*, *Piptothrix*, *Brickellia* (2), *Verbesina* (2) and *Liabum*.

Robinson, B. L. Notes on the genus *Mimosa* in Mexico and Central America. Proc. Boston Soc. Nat. Hist. **31**: 257–261. 20 F 1904.
With descriptions of 6 new species.

Robinson, B. L. Notes on some polygonums of western North America. Proc. Boston Soc. Nat. Hist. **31**: 261–265. 20 F 1904.
With descriptions of 3 new species of the section *Avicularia*.

Robinson, B. L. Synopsis of the mikanias of Costa Rica. Proc. Boston Soc. Nat. Hist. **31**: 254–257. 20 F 1904.
With descriptions of 3 new species of *Mikania*.

Rose, J. N. William M. Canby. Bot. Gaz. **37**: 384–388. *portrait*. 17 My 1904.

Rusby, H. H. Beverages of vegetable origin. Jour. N. Y. Gard. **5**: 79–86. Ap 1904.

Saccardo, P. A., Peck, C. H. & Trelease, W. The fungi of Alaska. Harriman Alaska Expedition, **5**: 11–64. *pl. 2–7*. 1904.
Includes descriptions of 39 species in 35 genera.

Sadebeck, R. Einige kritische Bemerkungen über Exoasceen. II. Ueber *Exoascus Sebastianae* nov. spec. Ber. Deuts. Bot. Gesells. **22**: 119–133. *pl. 9.* 24 Mr 1904.
On *Sebastiania brasiliensis.*

Sanford, S. N. F. The range of *Saururus cernuus* extended into Rhode Island. Rhodora, **6**: 77, 78. 6 Ap 1904.

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Saunders, D. A. The algae of the expedition. Harriman Alaska Expedition, **5**: 153–250. *pl. 10–29.* 1904.
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× *Dryopteris Pittsfordensis* hybr. nov.

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Smith, I. S. The nutrition of the egg in *Zamia.* Bot. Gaz. **37**: 346–352. *f. 1–6.* 17 My 1904.

Stuckert, T. Une nouvelle Mimosée, *Prosopis schinopoma,* de la République Argentine. Bull. Acad. Internat. Géogr. Bot. **13**: 87. 5 Mr 1904.

Sydow, H. & P. Neue und kritische Uredineen. Ann. Myc. **2**: 27–31. 15 F 1904.
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Sydow, H. & P. Novae *Fungorum* species. Ann. Myc. **2**: 162–174. 15 Ap 1904.
Includes 35 new American species in 23 genera.

Trelease, W. Alaskan species of *Sphagnum.* Harriman Alaska Expedition, **5**: 329–337. 1904.

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Ule, E. Ules Expedition nach den Kautschuk-Gebieten des Amazonenstromes. Fünfter Bericht. Notizbl. Königl. Bot. Gart. Berlin, **4**: 107–114. 30 Ja 1904.

Ule, E. Ules Expedition in das peruanische Gebiet des Amazonenstromes. Sechster Bericht. Notizbl. Königl. Bot. Gart. Berlin, **4**: 114–123. 30 Ja 1904.